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THE FESTIVUS

A publication of the San Diego Shell Club

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January 8, 1998

Number: 1

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Meeting date: third Thursday, 7:30 PM
Room 104, Casa Del Prado, Balboa Park



PROGRAM

Fossil and Recent Strombus

Dr. Kaustuv Roy is Assistant Professor in the Biology Department of the University of California at San Diego. He is using marine mollusks on the eastern Pacific shelf in his

research on species' diversity relative to latitude and longitude, currently examining the biogeography and evolution of over 3000 species. His illustrated program is on the strombids.

Meeting date: 15 January 1998
Shells of the month: Strombus

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CLUB NEWS

Minutes of the

San Diego Shell Club Meeting - November 20, 1997

Terry Arnold called the meeting to order at 7:30 p.m. The minutes were accepted as published in *The Festivus*. Terry announced the slate of officers for 1998. They are: President, Wes Farmer; Vice-President, Don Shasky; Recording Secretary, Silvana Vollero; Corresponding Secretary, Kim Hutsell; Treasurer, Margaret Mulliner; Editor, Carole Hertz. Since there were no nominations from the floor, Jules Hertz made a motion to approve the slate of candidates. The motion was carried unanimously and the officers will be installed at the Christmas Party.

Jules gave information on the Christmas party [see below] and then Wes introduced the speaker for the evening, Dave Mulliner, a familiar face to everyone. Dave's work as a marine-life photographer is well known. Dave had his photographic setup on display and gave a rundown on his equipment including his Snyder lens and "hints" on photographing very small shells. Dave went on to show photos of his trips to Baja California and the micro shells collected there. Despite the continuing problem of the lights in the room, Dave's photos were fantastic and enjoyed by all.

Wes Farmer provided the cookies and Terry won the door prize. The meeting was adjourned at 9:15 to allow members to enjoy refreshments, purchase books, tee-shirts and sweatshirts and peruse the Club library and the Mulliner's beautiful shell display.

Silvana Vollero

The Annual Christmas Dinner Party

The Club's annual Christmas Party at the Sheraton Four Points on Saturday evening December 6th was a huge success. The over thirty people in their holiday finery had a great time, enjoying the festive decorations, socializing with old friends and savoring the delicious dinner. The tables were set in red and white with centerpieces of poinsettias in Strombus shells arranged by Linda and Kim Hutsell, with shells donated by Don Pisor. (After dinner, those at each table drew lots for its centerpiece.) Taped carols were provided by Bill Romer who also acted as Club photographer.

After the dinner, the 1997 board members were thanked for their service, and the new board -- with only one change -- was welcomed. The traditional gift exchange followed with members carefully studying their choices of gift-wrapped packages under the beautifully decorated tree. Following the excitement of the gift exchange, a slide program by Wes Farmer, Richard Herrmann, Carole and Jules Hertz, Bruce Kemp and Dave Mulliner entertained the group. All especially applauded Bruce's images of his and Emi's wedding this year -- underwater in Hawaii. It was wonderful to share in their joy. Members and guests reluctantly ended the special evening at about 10:00 p.m.

Memberships for 1998

All subscriptions/memberships are now due for 1998. Membership for 1998 is the same as for 1997 (see masthead).

IN MEMORIAM

PAUL SKOGLUND

1918-1997

It is with deep sadness that we report the passing of Paul Skoglund, longtime Club member and dear friend. Paul was a computer buff who always enjoyed the challenge of solving computer problems. He created a dictionary of scientific names from Keen (1971) and made it available on diskette to all that were interested. It can be accessed on the internet. Paul was also a great small-boat dredger, designing and building dredges and inventing a tube-pulley arrangement [*The Festivus* 22(10: 106-109) now used by many for easier lifting of the dredge load. Paul's cheery smile and friendliness will be missed by all who knew him. He is survived by his wife Carol, two children, Chris and Stan, and four grandchildren.

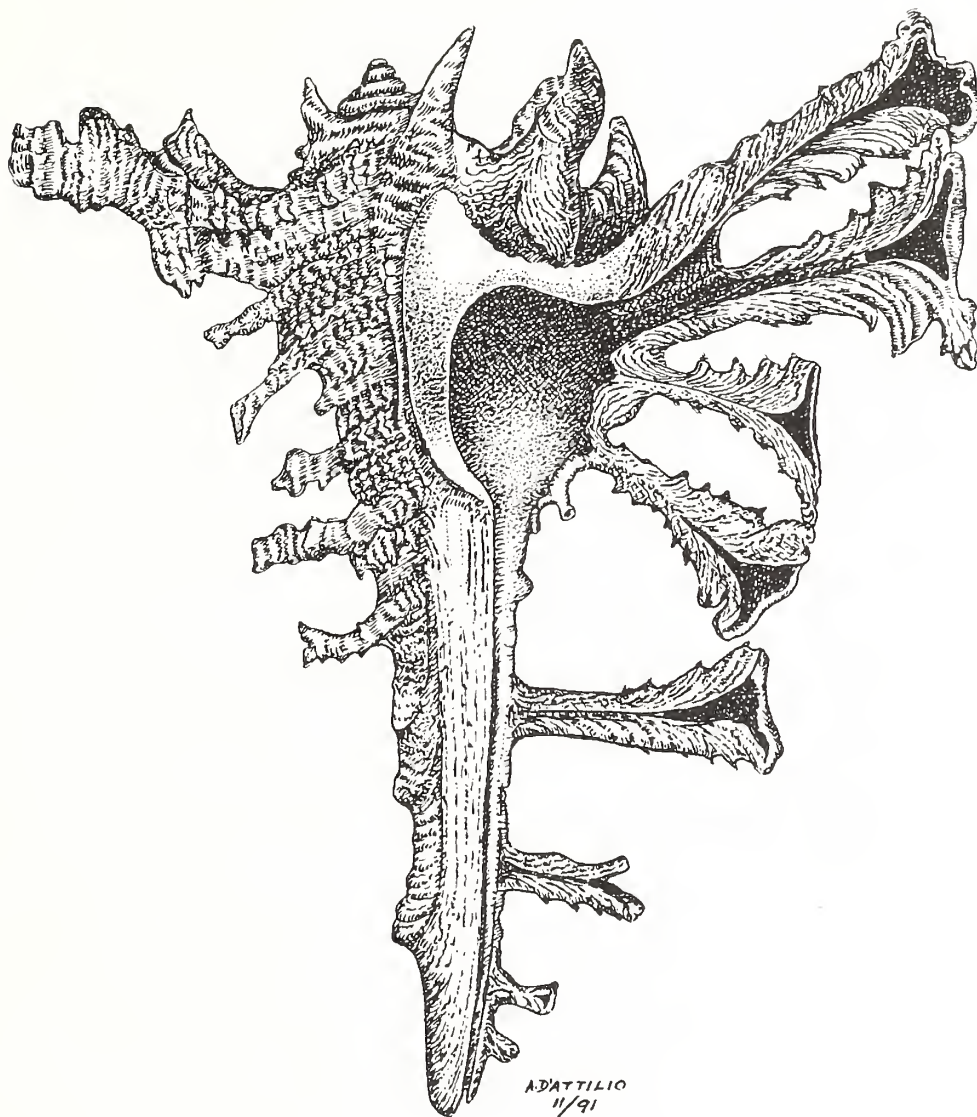


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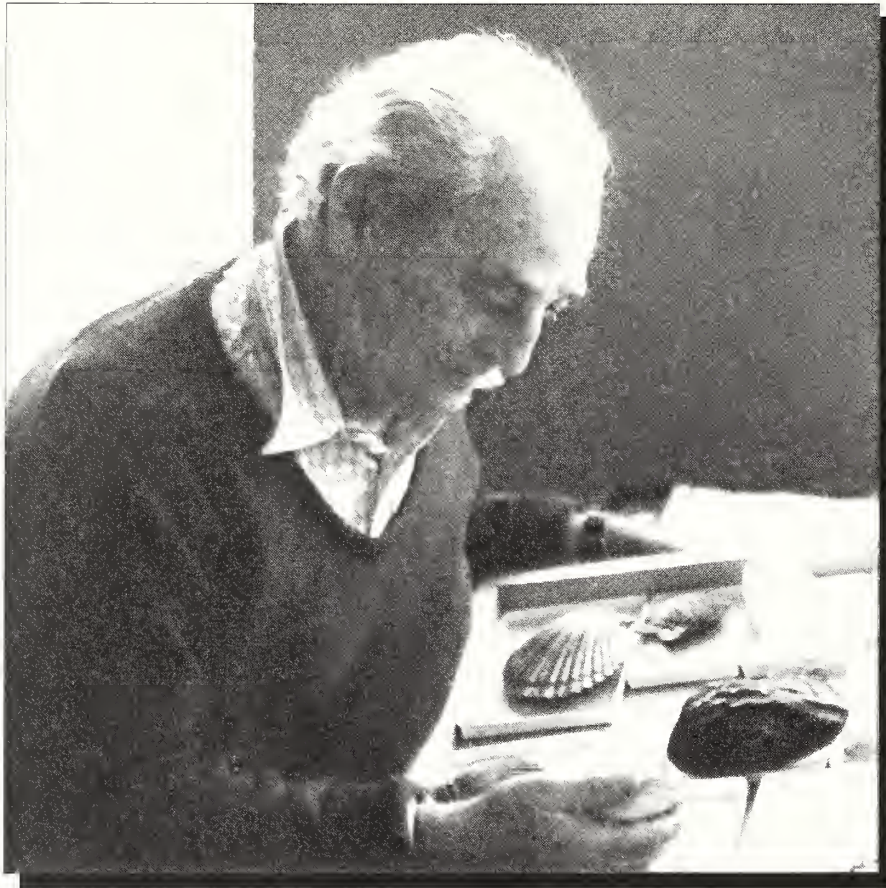
Volume: XXX(1)

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Homalocantha pisor D'Attilio & Kosuge, 1989

Anthony D'Attilio MEMORIAL ISSUE



Anthony D'Attilio
1909-1997

Front cover drawing used with the permission of D. & J. Pisor.
Inside front cover courtesy of San Diego Natural History Museum.

ANTHONY D'ATTILIO
1909-1997
BIOGRAPHICAL HIGHLIGHTS*

CAROLE M. HERTZ

Associate, Department of Marine Invertebrates, San Diego Natural History Museum,
P.O. Box 1390, San Diego, California 92112, USA

Anthony D'Attilio, born in the little town of Rodi Garganico in the province of Foggia in southern Italy on July 2, 1909, was the son of a longshoreman. The family emigrated to the United States when Tony was three years old, settling in Hoboken, New Jersey, where he attended elementary and high school. He said he gained much of his early education by reading the "*Encyclopedia Britannica* as most children read story books."

Tony's interest and talent in art was evident early and he began his art education in 1928 at night school in Manhattan at The Leonardo Da Vinci Art School and continued regular academic training for six years drawing and painting from life. In 1934, he simultaneously began a course in creative design at the Beaux Arts Institute of Design, studied mural painting, and married Rose Hartman, who became his life-long companion. Their marriage produced two children, Sandra and Lawrence, and eventually seven grandchildren and two great-grandchildren.

Tony pursued a career as a designer of glass engraving and executed large mural paintings, becoming a partner and designer in Harriton Carved Glass, 1945-1968. Among other installations, his carved glass eagle is in the ceiling of the Senate Rotunda and other decorative glass work can be found in other major government buildings in Washington, D.C., a mirrored cocktail table made for the Duke and Duchess of Windsor, windows in Notre Dame Church in New Hyde Park, New Jersey, and decorative panels for the Pennsylvania Railroad and major hotels in New York City. In the 1930s, examples of his carved glass were exhibited and in 1937 won a prize, at the Paris World's Fair. His glass was also exhibited in the New York

World's Fair in 1940, and in 1959 Steuben Glass accepted a glass engraving for an international exhibit at the Metropolitan Museum of Art in New York City; this work now on permanent exhibit at the Steuben Museum in Corning, New York.

Tony's interest in mollusks came later. He always said his fascination for shells didn't begin until his wife, Rose, in 1938, sent him some shells from Florida where she was on vacation. He soon became a knowledgeable collector and in 1939 was engaged as an expert to evaluate the rarity of shells in the famous Calvert Collection. In 1963 he published, with William K. Emerson of the American Museum of Natural History in New York, his first of many professional papers and later became an Associate in the Department of Living Invertebrates in that institution.

In 1968, on his own, he described the species *Latiaxis garrardi*. At the same time he was preparing drawings and watercolors for books on biology, insects and other natural history subjects including a major effort in illustrating 30 booklets on natural history subjects distributed by Doubleday Co., NY.

It was at this time that Tony retired from the glass business and he and Rose decided to relocate to California. While living briefly in Laguna Beach with their daughter Sandra, Tony was offered a part-time position at the San Diego Natural History Museum as assistant in the Department of Marine Invertebrates, at the request of its then curator Dr. George E. Radwin. The D'Attilios soon moved to San Diego where Tony, at 60 years of age, began another new career!

Soon after Tony's arrival at the Museum, he and George Radwin together began writing, and Tony illustrating, *Murex Shells of the World*, published in

1974 by Stanford University Press and still the "bible" for students of the Muricidae.

In 1971, Tony made what he considered the most significant discovery of his career. He found that a surface shell layer, thought by most to be incrustation, was actually a part of the mollusk shell, often with a unique sculptural pattern. He called this layer "intritacalx" (*intrita* = crumbly; *calx* = chalk). The information was published by D'Attilio and Radwin (1971).

Tony spent over 18 years at the San Diego Natural History Museum, his generous and gentle nature coupled with his keen mind making him a valued colleague and friend. Not long after the untimely death of Dr. Radwin in 1977, Tony became Acting Curator, a position he held from 1980 through 1987, except for two brief periods when other full-time curators headed the Department.

The Department flourished under Tony's leadership; volunteers served "long-term;" donations of molluscan study material were generous; his own research was extensive and he encouraged others in the Department to undertake research projects. Tony was a teacher by nature and willingly shared his knowledge of art and science with those with whom he worked. Although his position was still part-time, his output, either alone or with coauthors, of nine papers proposing new taxa, over 50 papers on descriptive taxonomy, and many popular articles is, indeed, enormous.

During his career in malacology, this self-taught scientist proposed, alone and with coauthors, two subfamilies, two genera and 75 species. Two species and a genus were named in his honor and he received an

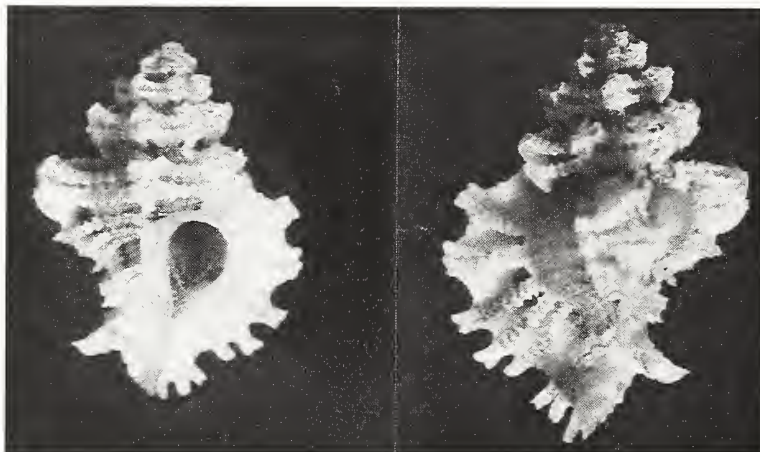
award of honor from The Western Society of Malacologists and honorary memberships in both the New York Shell Club and the San Diego Shell Club.

While working in malacology, Tony continued his art work and scientific illustration. There were one-man shows of his work held in galleries in Chicago, Milwaukee, San Diego and Sheboygan. Three exhibits of his art were also held in the San Diego Natural History Museum, the first in 1970, of his biological illustrations, showed the exacting side of art; the second, in 1976, displayed Tony's glass, metal, ink and mixed media creations reflecting "the subjective aspects of nature, how it affects the mind and feelings." The third, in 1983, "The World of Anthony D'Attilio," was a one-man show of Tony's intricate pen-and-ink drawings, filled with symbolism and fantasy.

Tony's interests were boundless. He was a history buff, was fascinated by anthropology, a lover of music, especially Bach, a collector, with Rose, of cactus and succulents, and an active member of the Cactus and Succulent Society. His art work graced the covers of their journal as well as those of cactus catalogues. This was a Renaissance Man.

In 1987, a full-time curator was hired and Tony's part-time position was eliminated. He retired again - this time to his studio — where his output of art work continued to grow. But in 1994, Tony's cherished wife and inseparable companion, Rose, died and soon Tony left San Diego for Laguna Beach to live with his daughter, Sandra, and family. He continued with his art work, but without his Rose, he was bereft. The world is poorer for his passing.

*Drawings by Tony and photos of taxa he described are placed throughout the issue.



Favartia (Murexiella) rosamiae D'Attilio & Myers, 1985, two views. Photo: B. W. Myers.

TO TONY, WITH LOVE

EMILY H. VOKES

Emerita, Department of Geology, Tulane University,
New Orleans, Louisiana 70118, USA

I must confess that the beginnings of my relationship with Tony D'Attilio are lost in the dim dark recesses of pre-history. I do not know who initiated our correspondence but I assume it was me, for during the early sixties I was a graduate student trying to learn as much as I could about the Muricidae and Tony was the person who seemed to know the most about them. During these years he was still in New York, working with Bill Emerson, at the American Museum of Natural History.

One subject of our discussions was the question of whether there was one or two species involved in what was then known as *Murex senegalensis*, type of the genus *Siratus*. Tony was confident there were two and sent me material from the American Museum collections to prove his point, resulting in my note temporarily renaming *Murex calcar* Kiener (the second species) as *Chicoreus (Siratus) carioca*. I say temporarily because shortly thereafter I discovered that the species had already been renamed by Dautzenburg as *Murex tenuivaricosus*. During these early years we had many problems of mutual concern and I know we maintained a voluminous correspondence -- my letters in my lousy typing, his always neatly written by hand.

It was not until the WSM meeting in 1973 at Pacific Grove that we actually met in person. And it was love at first sight! By this time Tony had joined forces with the late George Radwin and they were beginning their work on the *Murex Shells of the World*. George and I were poles apart when it came to the philosophy of what is a species -- and poor Tony was often as not caught in the middle, privately agreeing with me, but feeling that he had to go along with George -- these were indeed times that tried both our souls.

It was not until 1982 that Tony and I really had a chance to spend any time together. The late Ruth Purdy, who was an old friend and generous provider of study material, decided that it was time to dispose of her

collection and she called me to say -- if there is anything you need, come and get it! How could I refuse such an invitation! While in San Diego, I had the opportunity to spend a wonderful evening with Tony and his wife Rose at their home, where I was delighted by the beauty of Tony's "decorative" shells -- that is, the ones artistically arranged in the living room, as opposed to "working" shells in a cabinet.

But even more enjoyable was the introduction to his art. Of course, I was familiar with his fabulous shell drawings but I had never seen any of his non-shell art. By this time, George Radwin had unexpectedly died and the curatorial situation at the San Diego Natural History Museum was in disarray. So, increasingly Tony had turned to his first love, art. He had piles of incredible art-fantasies, verging on the surreal. After I admired them, he drew for me a wonderful frog that must be seen to be appreciated.

After George Radwin's death, Tony collaborated with a number of different scientists, describing many of the fascinating new muricid species that were appearing in great numbers from the tangle-nets of the Philippine Islands. We published three papers together, including reviews of the genera *Pygmaeptyrys* and *Attiliosa*, as well as describing the Galapagan species originally recognized as "different" by Ruth Purdy, *Favartia (Caribiella) purdyae*. It was always a pleasure to work with Tony, as we usually saw things from the same point of view. But with his artist's eye, he often showed me details I would have otherwise missed.

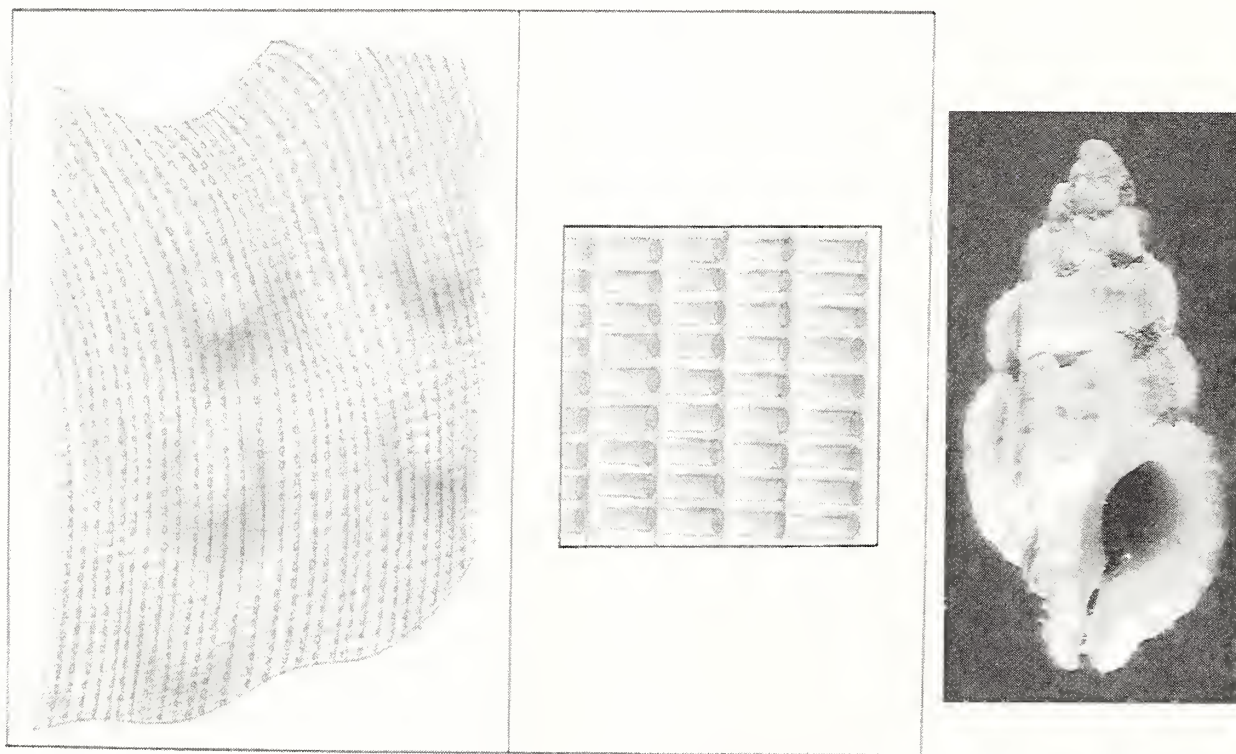
As an example of the latter, perhaps Tony's greatest malacological legacy will be his discovery of the intritacalx, a strange chalky outer layer found primarily in the muricid genera *Dermomurex* and *Aspella*, but also in other groups, notably the Cardiidae. George told me that this was Tony's discovery completely -- obviously, while examining shells as closely as he did to make his detailed drawings, he saw what none of us ever had

noticed and what, in fact, most collectors assiduously tried to "clean off" the shells. But his work, particularly well-documented in the appendix to the *Murex Shells of the World*, showed that each species has a different pattern of tubes and channels, revolutionizing the study of the previously incomprehensible genus *Aspella*.

Because of the problems at the San Diego Natural History Museum, Tony gradually drifted away from shells and with the death of his beloved Rose, he moved away from San Diego. Fortunately we were able to have one last visit in 1995, when my husband and I made a trip to the legendary Hotel Del Coronado and Tony's daughter Sandra brought him down so that we could all have dinner together. By then his health was failing and without Rose he really had little desire to

keep on living. But he assured me that he was still enjoying his art and his family. I was pretty sure then that it was the last occasion we would ever be together and so I especially cherished the hours we shared.

Although over the years we spent a remarkably small amount of time actually together, for over thirty years we maintained an extremely close and loving relationship by correspondence. I don't think Rose or Harold had any cause for divorce but we did truly love each other deeply and I shall miss Tony terribly. However, I have one constant reminder that will keep his memory ever green, for I have turned my bathroom into an art gallery, and the walls are covered with shell illustrations, primarily by Tony. And so I am reminded daily of his love for the muricids and for me in all of his drawings that bear the dedication -- to Emily, with love, Tony.



Aspella morchi Radwin & D'Attilio, 1976. (Left) D'Attilio drawing of intritacalx of *A. morchi*. Reprinted from Radwin & D'Attilio (1976, figure 167) *Murex Shells of the World* with permission of Stanford University Press. (Right) Apertural view of holotype of *A. morchi*, 6.6 x 3.3 mm, SDSNH 62609. Photo: D. K. Mulliner.

REMEMBERING

BARBARA W. MYERS

Associate, Department of Marine Invertebrates, San Diego Natural History Museum,
P.O. Box 1390, San Diego, California 92112, USA

My first collaboration with Tony was a small paper in 1979, "Range Extension for *Isognomon janus* Carpenter, 1857 (Bivalvia)." In 1980 we did a redescription of the hinge of a rather obscure bivalve, *Dimya californiana* Berry, 1936, both for *The Festivus*. For this second paper, Tony's drawings were vital. It was the beginning not only of our professional association but of a treasured friendship.

Tony was fun to work with. He had a great sense of humor. My initial experience with his droll wit occurred while we were discussing a muricid operculum. He had made two drawings, the interior (the side attached to the mollusk) and the exterior, which we were describing. It should have been a simple job, but we were making little progress. I was becoming irritated and I thought Tony was acting exceptionally obtuse. Are we discussing the same thing, I thought as the argument heated up? Suddenly, I stopped in mid-sentence. I had just realized he had the labels on the two drawings reversed, the exterior was labelled the interior and vice versa. He dug the pit and I tumbled headlong into it. I can still hear his sly chuckle.

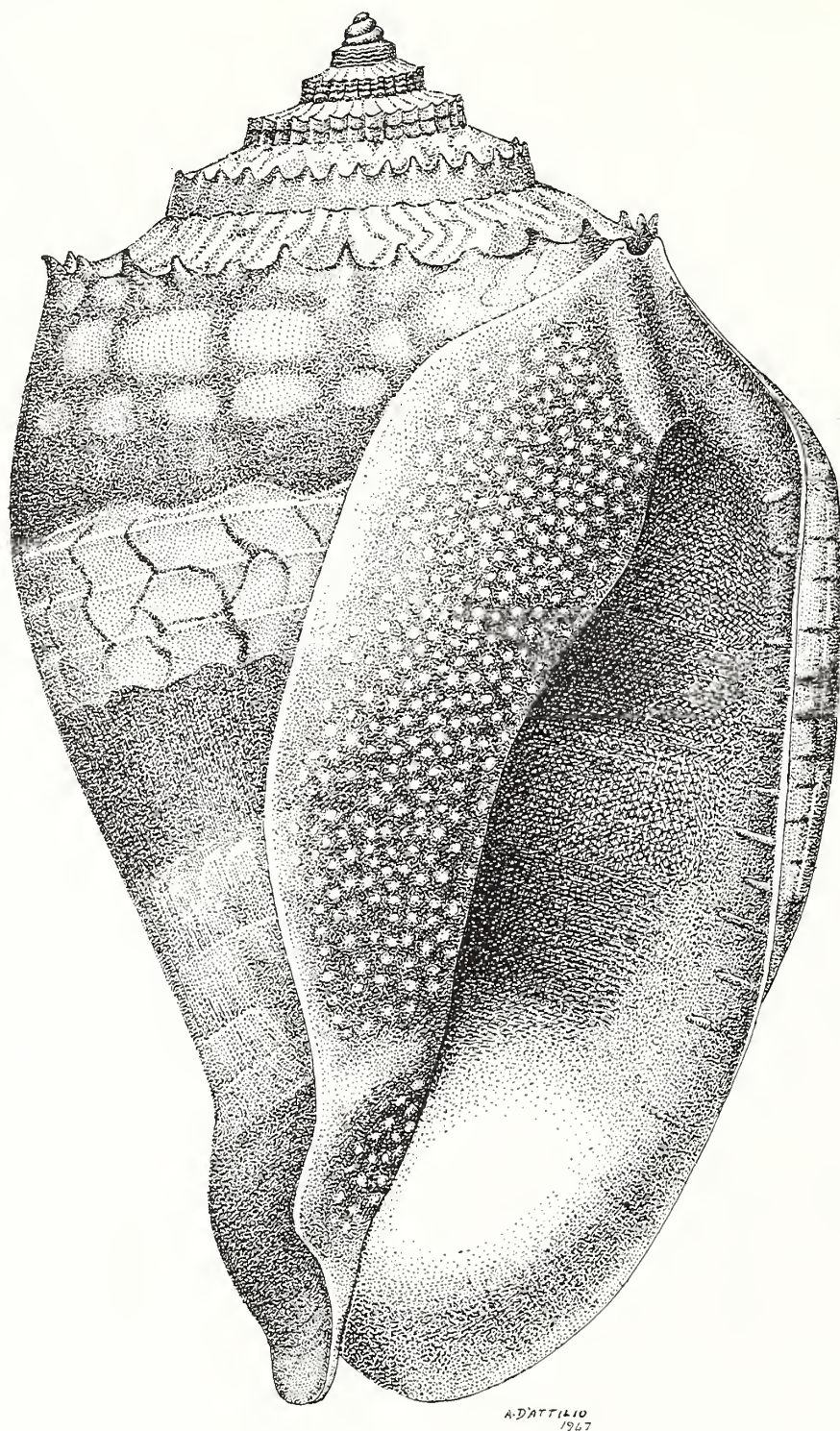
Tony's fascination with the intricate forms and shapes of the Muricidae and Coralliophilidae was stimulated one day when Donald Pisor of San Diego and Loyal J. Bibbey of Imperial Beach, both California, brought us specimens of the most ornate species we described, *Babelomurex jeanneae* D'Attilio & Myers, 1984 (Transactions of the San Diego Society of Natural History 20(5): 81-94). While we were working on that new species, Tony conceived the idea of an exhibit of other species of mollusks, many newly described, that had been collected in the same fashion as *B. jeanneae*, by fishermen using tangle nets in deep water. *Babelomurex jeanneae* was brought up from 400+ feet of water in the Bohol Straits off the Philippine Islands. With his enthusiasm and artistry, an exquisite and exciting exhibit, "Rare, Rediscovered and Newly-

Described Marine Mollusks, Gems of the Ocean from the Malacology Department," was created and opened on 24 June 1985. Dismantled now, the exhibit was enjoyed for about five years.

Diving off the remote Isla del Coco, Costa Rica, Dr. Donald R. Shasky of Oceanside, California, and Gene Everson of Louisville, Kentucky, collected specimens of an undescribed *Phyllonotus*. This beautiful species was the largest muricid we described. We called it *P. eversoni* D'Attilio, Myers & Shasky, 1987 (The Nautilus 101(4): 162-165), naming it for Gene Everson who donated his specimen as the holotype.

When we began working on a small *Favartia* from the Solomon Islands brought to us by Charles Glass and Robert Foster of Santa Barbara, California, we had no idea of the tangled knot we would have to unravel. Solving one piece of the puzzle only brought other problems to our attention. Glass and Foster had called their specimens *F. peasei* (Tryon, 1880), a replacement name for *F. foveolatus* (Pease, 1869, not Hinds, 1844). This name had been around for over 100 years with an unrecognizable figure and a type locality attributed to both the eastern and western Pacific. After finally solving the enigma of *F. peasei* and designating a lectotype, we found it was not conspecific with our specimens. It should have been clear sailing after that, but we were soon immersed in further complications. In comparing our specimens with *F. striasquamosa* Ponder, 1972, we discovered the paratypes were conspecific with our new species, but the holotype was not. We named our new species *F. ponderi* Myers & D'Attilio, 1989 (Venus 48(3): 154-160). Tony's drawings were invaluable in understanding these problems.

We worked well together. He taught me a great deal, generously sharing his knowledge and expertise. They were good years. Tony was a dear friend. I will remember him with tears and laughter and love.



Morum veleroae Emerson, 1968
Pen and ink drawing by Anthony D'Attilio in 1967.
Drawing used with the permission of W. K. Emerson.

ANTHONY D'ATTILIO: FRIEND, COLLEAGUE AND COLLABORATOR

WILLIAM K. EMERSON

Curator Emeritus of Mollusks, American Museum of Natural History,
Central Park West at 79th St., New York, NY 10024, USA

Tony D'Attilio was a good friend and a valued colleague. When I arrived at the American Museum of Natural History fresh out of Berkeley in October of 1955, Tony and his wife, Rose, went out of their way to introduce me to the intricacies of the Big Apple and to make me feel most welcome. The New York Shell Club was flourishing at the time, and Tony and his good friend Karl Jacobson (1906-1980) were mainstays of the organization. Tony and Karl were appointed Associates in Malacology at the American Museum of Natural History and a long association with them was initiated.

Tony was an extremely knowledgeable student of marine mollusks, and he shared his expertise of the muricacean gastropods with all his many friends. Our first collaboration concerned the rediscovery of the muricid *Pterynotus centrifuga* (Hinds, 1844). A specimen Tony had purchased from the 19th Century John Calvert Collection, which had been offered for sale in New York City, was recognized as Hinds' figured specimen and it was designated the lectotype of this taxon (Emerson, 1960).

Eventually, Tony and I coauthored fourteen

scientific papers from 1962 to 1981, eleven of which pertained to the Muricacea. He also illustrated several of my books, including *Shells of the New York City Area*, 1961, (Jacobson & Emerson), *Wonders of Barnacles*, 1974, (Ross & Emerson) and provided radular and opercular drawings for many of my scientific publications. Color drawings by Tony illustrate the micromollusks in the exhibit "Shells of New York State" in the American Museum of Natural History.

Tony was a talented artist in many media, and he was one of the very best scientific illustrators of his time. He also contributed creative drawings, paintings, glass etchings, and sculptures to decorate my apartment.

In short, Tony was truly a Renaissance man with multifaceted interests in science, art, history and horticulture. He was certainly one of a kind! He believed, "Life is a time bomb awaiting to explode." Fortunately, he enjoyed a long and productive run. Tony will be sorely missed by his many friends and colleagues and he leaves a rich legacy of numerous contributions to the field of malacology.

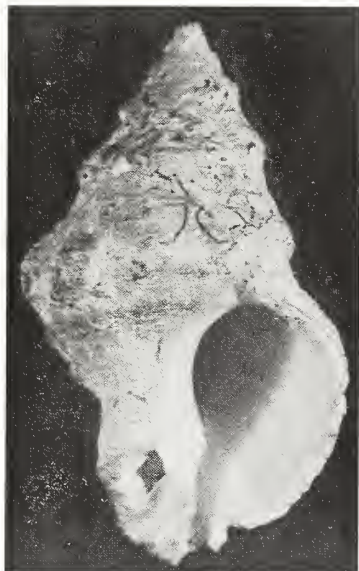


(Left) *Murexiella radwini* Emerson & D'Attilio, 1970. (Right) *Pteropurpura benderskyi* Emerson & D'Attilio, 1979. Photos: D. K. Mulliner.

TAXA NAMED IN HONOR OF ANTHONY D'ATTILIO

Attiliosa Emerson, 1968

Type species: *Coralliophila incompta* Berry, 1960. [Leaflets in *Malacology* 1: 119-120; fig'd. Hertz (1984), *The Festivus* 15 (Supplement):1-42, figs. 1-92].



Attiliosa incompta Berry, 1960. Holotype: 33.5 x 20.3 mm, WAM 3646-67 [= *Calotrophon (Attiliosa) incompta* (Berry) Radwin & D'Attilio, 1976: 26; = *Attiliosa nodulosa* (A. Adams, 1855) Bullock, 1976 (*Tulane Studies in Geology. & Paleont.* 2(3):133); Radwin & D'Attilio, 1978:132; Vokes & D'Attilio 1982: 69]. Photo: L. Poorman.

Eulimostraca attiloi Hertz & Hertz, 1982

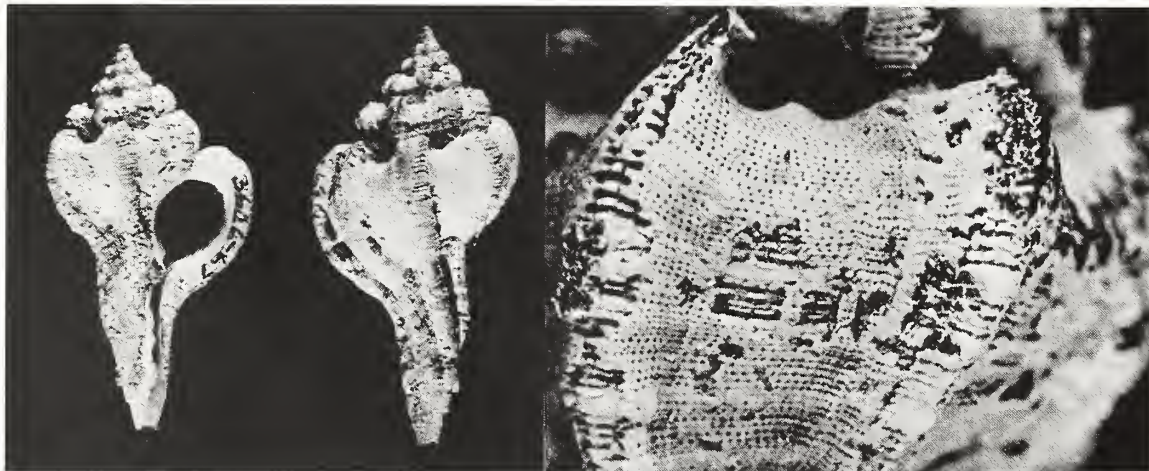
The Veliger 25(1): 72-74, figs. 1-9.



Eulimostraca attiloi Hertz & Hertz, 1982. Three views of holotype: 7.57 x 3.08 mm, SDNHM 80762 [= *Niso attiloi* (Hertz & Hertz) Warén, 1992 [*The Veliger* 35(3): 177-194, figs. 1-59]. Photos: D. K. Mulliner.

Dermomurex (Viator) antonius Vokes, 1974

Journal of the Malacological Society of Australia 3(1): 4, pl. 1, figs. 1, 2.



Dermomurex (Viator) antonius Vokes, 1974. Holotype: 25.7 x 13.5 mm, WAM 3646-67. (Left to right) Apertural view. Dorsal view. Detail of intritacalx on the shell.

TAXA PROPOSED BY ANTHONY D'ATTILIO

Subfamilies

Muricopsinae Radwin & D'Attilio, 1971: 64
 Tripterotyphinae D'Attilio & Hertz, 1988: 6, 7

Genera

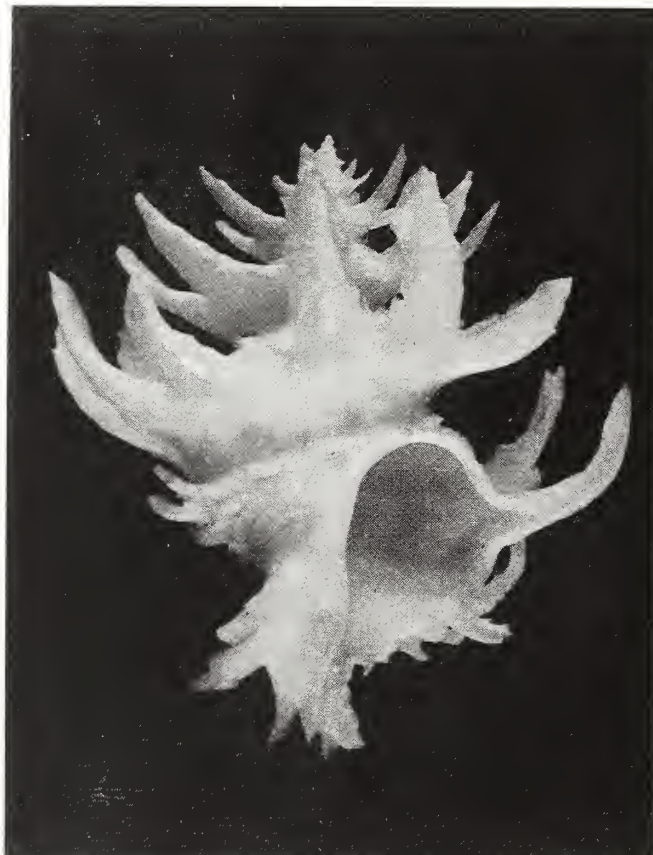
Bizetiella Radwin & D'Attilio, 1972: 341, 342
Evokesia Radwin & D'Attilio, 1972: 335, 336

Species

[The following species, described by Anthony D'Attilio and with co-authors, are listed alphabetically by species in their original orthography with page and figure references.]

- akritos*, *Chicoreus* Radwin & D'Attilio, 1976: 228, 229; pl. 4, fig. 1.
albobrunneus, *Pterynotus* Bertsch & D'Attilio, 1980: 131-133; figs. 1, 2.
angermeyerae, *Aspella* (*Favartia*) Emerson & D'Attilio, 1965: 1-4; figs. 1-5.
aparii, *Pterynotus* D'Attilio & Bertsch, 1980: 172, 173; figs. 2a-d.
armeniaca, *Coralliophila* D'Attilio & Myers, 1984: 89-91; figs. 21-24a, b.
artemis, *Chicoreus* Radwin & D'Attilio, 1976: 32; pl. 4, fig. 4. [new name for *Murex aculeatus* Lamarck, 1822 (not Schlotheim, 1820)].
bellini, *Pygmaepterys* D'Attilio & Myers, 1985: 9-12; figs. 1-4, 9, 12.
benderskyi, *Pteropurpura* Emerson & D'Attilio, 1979: 2, 4; figs. 1, 2, 19.
bengalensis, *Taliphyphis* Radwin & D'Attilio, 1976: 234, 235; figs. 186, 187.
bibbeyi, *Marchia* Radwin & D'Attilio, 1976: 229; fig. 176.
campbelli, *Taliphyphis* Radwin & D'Attilio, 1976: 235, 236; figs. 188, 189.
caroleae, *Coralliophila* D'Attilio & Myers, 1984: 91, 92; figs. 26-28.
castor, *Aspella* Radwin & D'Attilio, 1976: 219, 220; pl. 28, fig. 1, text figs. 158-160.
cocosensis, *Favartia* Myers & D'Attilio, 1990: 282-285; figs. 1-3.
cryptica, *Aspella* Radwin & D'Attilio, 1976: 220, 221; pl. 1, fig. 10, text figs. 161, 162.
dalli, *Latiaxis* (*Babelomurex*) Emerson & D'Attilio, 1963: 4-8; figs. 1-3.
deroyae, *Strombina* Emerson & D'Attilio, 1969: 195-197; pl. 39.
deroyorum, *Babelomurex* D'Attilio & Myers, 1984: 84-86; figs. 10-14.
dondani, *Homalocantha* D'Attilio & Kosuge, 1989: 128, 129; pl. 49, figs. 3, 4, text figs. 3, 6.
dorothyae, *Favartia* Emerson & D'Attilio, 1979: 5, 6; figs. 3, 4, 15, 16.
drezi, *Pygmaepterys* Vokes & D'Attilio, 1980: 48, 49; pl. 1, fig. 5.
elatensis, *Favartia* Emerson & D'Attilio, 1979: 6, 7; figs. 13, 14.
elvira, *Coralliophila* D'Attilio & Emerson, 1980: 69, 70; pl. 19, figs. 1, 2; pl. 20, figs. 1, 3, 4.
emersoni, *Favartia* Radwin & D'Attilio, 1976: 147; pl. 24, fig. 7 [new name for *Murex gravidus* Hinds, 1844 (not Dujardin, 1837)].
eversoni, *Phyllonotus* D'Attilio, Myers & Shasky, 1987: 162, 164; figs. 1, 2.
fearnleyi, *Latiaxis* (*Babelomurex*) Emerson & D'Attilio, 1965: 101-103, pl. 10, figs. 1-4, 6.
fosteri, *Naquetia* D'Attilio & Hertz, 1987: 192-195; figs. 1-6.
galapaganus, "*Murex*" Emerson & D'Attilio, 1970: 271, 272; pl. 39, figs. 3-6, text figs. 3, 4.
garrardi, *Latiaxis* D'Attilio, 1968: 7-9; pl. 1 (top 4 figs.).
germainae, *Pygmaepterys* Vokes & D'Attilio, 1980: 50, 51; pl. 1, figs. 1-4.
guamensis, *Favartia* Emerson & D'Attilio, 1979: 4, 5; figs. 11, 12.
huberti, *Muricopsis* Radwin & D'Attilio, 1976: 232, 233; figs. 182, 183.
jacobsoni, *Muricodrupa* Emerson & D'Attilio, 1981: 78-81; figs. 1-4.
jacquelinae, *Murexsul* Emerson & D'Attilio, 1969: 324, 325; pl. 50, text fig. 1.
jaliscoensis, *Muricopsis* Radwin & D'Attilio, 1970: 353-355; pl. 52, figs. 4-6, text figs. 2, 4.
jeanae, *Favartia* Bertsch & D'Attilio, 1980: 133-135; figs. 3-5.
jeanneae, *Babelomurex* D'Attilio & Myers, 1984: 86-88; figs. 15-20.
judithae, *Favartia* D'Attilio & Bertsch, 1980: 177, 178; figs. 3d, 4a-4d.
leoneae, *Favartia* (*Murexiella*) D'Attilio & Myers, 1985: 60, 61; figs. 7-11.
macleani, *Pterynotus* (*Purpurellus*) Emerson & D'Attilio, 1969: 147, 148; pl. 26, figs. 1-4.
mactanensis, *Murexiella* Emerson & D'Attilio, 1979: 7; figs. 7, 8.
mauritianae, *Aspella* Radwin & D'Attilio, 1976: 221-223; pl. 28, fig. 4, text figs. 163-165.
micaela, *Bizetiella* Radwin & D'Attilio, 1972: 343-347; figs. 21-23.
minatauros, *Favartia* Radwin & D'Attilio, 1976: 150, 151; pl. 24, fig. 3 [new name for *Murex obusus* Sowerby, 1894 (not Bellardi, 1872, or Sowerby, 1879)].
morchii, *Aspella* Radwin & D'Attilio, 1976: 223, 224; pl. 1, fig. 9, text figs. 166, 167.
myrakeenae, *Aspella* Emerson & D'Attilio, 1970: 89-92; figs. 1-11.
pelepili, *Favartia* D'Attilio & Bertsch, 1980: 174-177; fig. 3a-c.
perchardei, *Taliphyphis* Radwin & D'Attilio, 1976: 236-238; pl. 30, fig. 15, text figs. 190-192.
pisori, *Homalocantha* D'Attilio & Kosuge, 1989: 125, 126; pl. 48, figs. 1-7, pl. 49, fig. 2, text figs. 1, 4.
pisori, *Latiaxis* D'Attilio & Emerson, 1980: 71; pl. 19, figs. 5, 6; pl. 20, fig. 7.
platylaevis, *Aspella* Radwin & D'Attilio, 1976: 224, 225; pl. 28, fig. 3, text figs. 168-170.
pollux, *Aspella* Radwin & D'Attilio, 1976: 225-227; pl. 1, figs. 3, 29, text figs. 171-173.
ponderi, *Aspella* Radwin & D'Attilio, 1976: 227, 228; pl. 28, fig. 6, text figs. 174, 175.
ponderi, *Favartia* (*Caribiella*) Myers & D'Attilio, 1989: 156; figs. 3-8.
poormani, *Favartia* Radwin & D'Attilio, 1976: 231, 232; pl. 24, fig. 9, text figs. 180, 181.
pratulum, *Pygmaepterys* Vokes & D'Attilio, 1980: 49, 50; pl. 1, figs. 6, 7.
purdyae, *Favartia* (*Caribiella*) Vokes & D'Attilio, 1980: 16-18; figs.

- 1-3.
purdyae, *Murex* Radwin & D'Attilio, 1976: 229-231, text figs. 177-179.
raderi, *Cymatium* D'Attilio & Myers, 1984: 33-36; figs. 7-12.
radwini, *Murexiella* Emerson & D'Attilio, 1970: 270, 271; pl. 39, figs. 1, 2, text fig. 2.
radwini, *Siphonochelus* Emerson & D'Attilio, 1979: 8, 9; figs. 20, 21.
rileyi, *Hexaplex* D'Attilio & Myers, 1984: 82-84; figs. 1-6.
rosi, *Typhina* Bertsch & D'Attilio, 1980: 135-137; figs. 6, 7.
robertsoni, *Favartia* D'Attilio & Myers, 1986: 80-82; figs. 9-12, 14-16.
rocasuciaae, *Coralliophila* Myers & D'Attilio, 1990: 287-290; figs. 13-16.
rosamiae, *Favartia* (*Murexiella*) D'Attilio & Myers, 1985: 58-60; figs. 1-6.
santacruzensis, *Latiaxis* (*Babelomurex*) Emerson & D'Attilio, 1970: 272, 273; pl. 40, figs. 1-4.
shaskyi, *Bizetiella* Radwin & D'Attilio, 1972: 347-350; figs. 24-26.
shaskyi, *Favartia* (*Murexiella*) D'Attilio & Myers, 1988: 106-109; figs. 1-8.
skoglundae, *Muricopsis* Myers, Hertz & D'Attilio, 1993: 78-80; figs. 1-5.
trivariacosa, *Favartia* D'Attilio & Myers, 1986: 82, 83; figs. 17, 18.
tulensis, *Muricopsis* Radwin & D'Attilio, 1976: 233, 234; text figs. 184, 185.
vicdani, *Homalocantha* D'Attilio & Kosuge, 1989: 126, 128; pl. 49, figs. 1, 5, 6, text figs. 2, 5.
westonensis, *Muricopsis* Myers & D'Attilio, 1990: 285-287; figs. 5-10.
wilsoni, *Haustellum* D'Attilio & Old, 1971: 316, 317; figs. 1, 2.



(Left) *Naquetia fosteri* D'Attilio & Hertz, 1987. Paratype SDNHM 91997, 71.5 x 26.2 mm. (Right) *Babelomurex jeanneae* D'Attilio & Myers, 1984. Paratype SDNHM 81402, 22.9 x 25.9 mm. Photos: D. K. Mulliner.

PUBLISHED WORKS OF ANTHONY D'ATTILIO

[An asterisk (*) denotes a work in which new taxa have been proposed.]

D'ATTILIO, ANTHONY

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- 1957a. *Tudicula armigera* A. Adams. New York Shell Club Notes 31: 5; 1 fig. (Apr.)
- 1957b. Further note on *Perotrochus teramachii* Kuroda. New York Shell Club Notes 32: 4; 2 figs. (June)
- 1957c. *Mitra regina* Sowerby: New York Shell Club Notes, 36: [1 page, unpaginated]; 2 figs. (Nov.)
- 1958a. Material for a catalog of East African cones. New York Shell Club Notes 38: 2, 3. (Jan.)
- 1958b. An analysis of *Conus textile* from East Africa. New York Shell Club Notes 39: 3, 4; 2 figs. (Feb.)
- 1958c. East African cones (continued). New York Shell Club Notes 41: 2, 3; 1 fig. (Apr.)
- 1958d. East African cones. New York Shell Club Notes 42: 2; 3 figs. (May)
- 1958e. East African cones (continued). New York Shell Club Notes 43: 2, 3; 2 figs. (June)
- 1958f. A banded color from [sic] of *Vasum muricatum* Born. New York Shell Club Notes 45: 2; 2 figs. (Sept.)
- 1958g. A trio of East African cones. New York Shell Club Notes 46: 3, 4; 3 figs. (Nov.)
- 1958h. *Conus imperialis* L. on the East African coast. New York Shell Club Notes 47: 3. (Dec.)
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- 1959b. Some *Strombus* from East Africa. New York Shell Club Notes 49: 2, 3; 3 figs. (Feb.)
- 1959c. What is *Conus lignarius* Reeve? New York Shell Club Notes 50: 3-5; 3 figs. (Mar.)
- 1961a. The overcoat of a shell. Shells and Their Neighbors 5: 1, 2; 5 figs. (June)
- 1961b. Some corrections and additions to "Rediscovered or new Localities for *Conus*" (Notes no. 69). New York Shell Club Notes 74: 6, 7. (Sept.)
1962. The status of *Conus fuscatus* Born. New York Shell Club Notes 81: 5, 6.
1963. Rediscovery of an Arabian Sea *Murex*. New York Shell Club Notes 96: 8; 2 figs.
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- 1966a. *Favartia tetragona* Broderip. New York Shell Club Notes 120: 4, figs. 1, 2. (Mar.)
- 1966b. Notes on the Japanese species of the family Muricidae. Hawaiian Shell News 14(7): 1; 4 figs. (May)
- 1966c. Observations on the genus *Poropteron* Jousseaume, 1880. New York Shell Club Notes 123: 5, 6; 2 figs. (Jun.-Aug.)
- 1966d. A note on the distribution of *Murex banksi* Sowerby. New York Shell Club Notes 125: 2; 1 fig. (Oct.)
- 1966e. *Murex barclayanus*, a rare species. New York Shell Club Notes 126: 2; 2 figs. (Nov.)
1967. *Muricanthus melanamathos*, a West African muricid. The Nautilus 80(3): 96-99; pl. 5.
- *1968a. A new species of *Latiaxis* (Gastropoda: Magilidae) from Queensland, Australia. Journal of the Malacological Society of Australia 11: 7-9; pl. 1.
- 1968b. Some remarks on Caribbean muricids. New York Shell Club Notes 142: 3, 4; 1 fig.
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- 1972a. The periostracum of mollusks. The Festivus 3(7): 6, 7 [from New York Shell Notes, 1960]. (July)
- 1972b. Remarks on Coralliophilidae (Gastropoda, Muricacea). The Festivus 3(8): 2-5; figs. 1-16. (Aug.)
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- 1978b. George E. Radwin 1940 - 1977, some biographical notes and the San Diego years 1968 - 1977. The Festivus 10(2): 10-12; 1 fig. (Feb.)
- 1978c. Notes on *Genkaimurex fimbriatulus* (A. Adams, 1862). The Festivus 10(5): 37-39; figs. 1-4. (May)
- 1978d. Notes on the siphonal canal in Muricidae. The Festivus 10(6): 47-48; figs. 1-2. (June)
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- 1979a. Intraspecific variation in *Chicoreus artemis*. Hawaiian Shell News 27(3): 16; 1 fig. (Mar.)

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- 1979c. A hard look at *Murex nigrispinosus* and *M. tribulus*. Hawaiian Shell News 27(5): 16; 2 figs. (May)
- 1979d. *Tripterotyphis lowei* from the Solomon Islands. The Festivus 11(7): 51-53; figs. 1-6. (July)
- 1979e. Corrections and additions to the catalogue of the family Coralliophilidae. The Festivus 11(10): 83-85. (Oct.)
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- 1980b. *Actinotrophon actinophorus* (Dall, 1889). The Festivus 12(4): 61-62; fig. 1. (Apr.)
- 1980c. A supplementary note on *Favartia dorotheae* Emerson & D'Attilio, 1979. The Festivus 12(5): 67-68; figs. 1-5. (May)
- 1980d. *Muricopsis jaliscoensis* Radwin & D'Attilio, 1970 at Panama. The Festivus 12(6): 78-79; figs. 1-4. (June)
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- 1980f. Notes on gastropod radulae. The Festivus 12(9): 110-114; figs. 1-10. (Sept.)
- 1980g. Deception in shell appearance. The Festivus 12(11): 129-132; figs. 1-8. (Nov.)
- 1981a. Observations on two problem species from the Indo-Pacific. The Festivus 13(1): 2-6; figs. 1-7. (Jan.)
- 1981b. Two problematic coralliophilid gastropods. The Festivus 13(2): 16-20; figs. 1-4. (Feb.)
- 1981c. The rediscovery of *Murex cirrosus* Hinds, 1844. The Festivus 13(4): 46-51; figs. 1-8. (Apr.)
- 1981d. *Murex (Ocinebra) sykesi* Preston, 1904. The Festivus 13(6): 73-75; figs. 1-2. (June)
- 1981e. Note on the holotype of *Murex laqueatus* Sowerby, 1841 (Gastropoda: Muricidae) with a description of a specimen from Guam. The Festivus 13(7): 78-81; figs. 1-5. (July)
- 1981f. Book review. The Festivus 13(9): 103 [*The Family Buccinidae Part 1: the Genera Nassaria, Trajana and Neoterion* by W. O. Cernohorsky]. (Sept.)
- 1981g. The radula of *Neoterion ariel* (Pilsbry & Lowe, 1932) (Gastropoda: Buccinidae). The Festivus 13(9): 104, 105; figs. 1-3. (Sept.)
- 1981h. Observations on *Muricanthus radix* (Gmelin, 1791) (Gastropoda: Muricidae: Muricinae). The Festivus 13(10): 113-115; figs. 1-6 [from a paper presented at WSM - 1981]. (Oct.)
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- 1982c. The ontogeny of some muricid species from the Gulf of California, Mexico [Abstract]. The Western Society of Malacologists, Annual Report 14: 17. (July)
- 1982d. Convergence in the typhine form. The Festivus 14(8): 94-98; figs. 1-14. (Aug.)
- 1982e. *Favartia guamensis* Emerson & D'Attilio, 1979: observation on its geographical distribution. The Festivus 14(9): 105-106; figs. 1-3. (Sept.)
- 1983a. Concerning the identity of *Murex pagodus* A. Adams, 1853. The Festivus 15(1): 2-4; figs. 1-9. (Jan.)
- 1983b. Book review. The Festivus 15(2): 29 [*Compendium of Seashells* by R. T. Abbott & S. P. Dance]. (Feb.)
- 1983c. A further note on *Favartia sykesi* (Preston, 1904). The Festivus 15(4): 40, 41; figs. 1-2. (Apr.)
- 1983d. *Homalocantha secunda* - notes on distribution, shell morphology, and radula. The Festivus 15(5): 48-50; figs. 1-6. (May)
- 1983e. Lineages and convergence in the Typhinae (Muricidae) [Abstract]. The Western Society of Malacologists, Annual Report 15: 18. (Aug.)
- 1983f. Microscopic examination of the surface sculpture, protoconch, and operculum of *Homalocantha oxyacantha* (Broderip, 1833). The Festivus 15(9): 92, 93; figs. 1-5. (Sept.)
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- 1983h. Notes on murex. Conchologists of America Bulletin 11(4): 50; fig. 1. (Dec.)
- 1984a. An unusual color form of *Phyllonotus erythrostoma* (Swainson, 1831). The Festivus 16(1): 6, 7; figs. 1-4. (Jan.)
- 1984b. Book review. The Festivus 16(9): 92 [*Rare Shells of Taiwan in Color* by T. C. Lan]. (Sept.)
- 1984c. Remarks on the systematics of the genus *Homalocantha* family Muricidae, subfamily? Muricinae. Conchologists of America Bulletin 12(4): 51, 52; figs. 1-7. (Dec.)
- 1985a. A note on the geographical distribution of *Favartia (Caribiella) purdyae* Vokes & D'Attilio, 1980 (another species named for Ruth Purdy). The Festivus 17(3): 25, 26; figs. 1, 2. (Mar.)
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- 1985c. Book review. The Festivus 17(5): 48, 49 [facsimile edition of: *Thesaurus Conchyliorum or Monographs of Genera of Shells, Monographs of the Genus Murex*]. (May)
- 1985d. Illustrations and comments on *Typhina pauperis* Mestayer, 1916. Conchologists of America Bulletin 13(2): 27; figs. 1, 2. (June)
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- 1985j. *Latiaxis (Latiaxis) pisori* D'Attilio & Emerson and its generic affinities. Hawaiian Shell News 33(12): 3. (Dec.)

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- 1987c. Morphology of the spine in two closely related *Favartia* species: *Favartia (Murexiella) pelepili* (D'Attilio & Bertsch, 1980) and *F. (M.) judithae* (D'Attilio & Bertsch, 1980). The Festivus 19(7): 63-65; figs. 1-4. (July)
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- 1988c. Book review. The Festivus 20(4): 32 [Molluschi Edulii delle Marche, author & publication date not given]. (Apr.)
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- 1989c. Illustrations of a deep water form of *Homalocantha scorpio* (Linné, 1758). The Festivus 21(4): 35, 36; figs. 1-5. (Apr.)
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A PARTIAL LIST OF SCIENTIFIC AND NATURE BOOKS
ILLUSTRATED BY ANTHONY D 'ATTILIO

Shells of the New York City Area by M. K. Jacobson & W. K. Emerson. Argonaut Books, Inc. NY (1961).

The Invertebrates, Mollusca I, vol. 6 by Libbie H. Hyman (line drawings) (1967).

Octopus Lives in the Ocean by W. & P. Stephens. Holiday House, NY (1968).

Seahorse, A Fish in Armor by W. & P. Stephens. Holiday House, NY (1969).

Shells from Cape Cod to Cape May by M. K. Jacobson & W. K. Emerson. Dover, NY (1971).

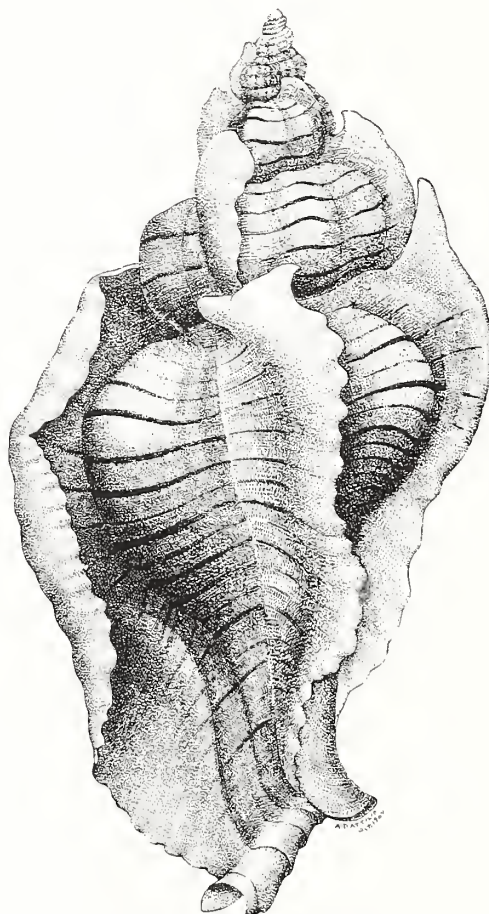
Biology and Immature Stages of Moroccan Panurgine Bees... by Jerome G. Rozen, Jr. American Museum Novitates (1972).

Seashore Life Coloring Book by A. D'Attilio, Dover, NY (1973).

Wonders of Barnacles by A. Ross & W. K. Emerson. Dodd, Mead, NY (1974).

Murex Shells of the World an Illustrated Guide to the Muricidae by G. E. Radwin & A. D'Attilio (all line drawings) (1976).

[Also illustrated over 30 Doubleday booklets on natural history [Audubon Book Club (1964-1968)]; 3 covers for the *Cactus and Succulent Journal of America*, 4 covers for the *Conchologists of America Bulletin*, 2 covers and many illustrations for *Environment Southwest*, former magazine, San Diego Natural History Museum and covers of 3 SDNHM calendars and catalogues and molluscan illustrations for numerous papers proposing new species. Designed logos for the American Malacological Union, the New York Shell Club and the San Diego Shell Club.]

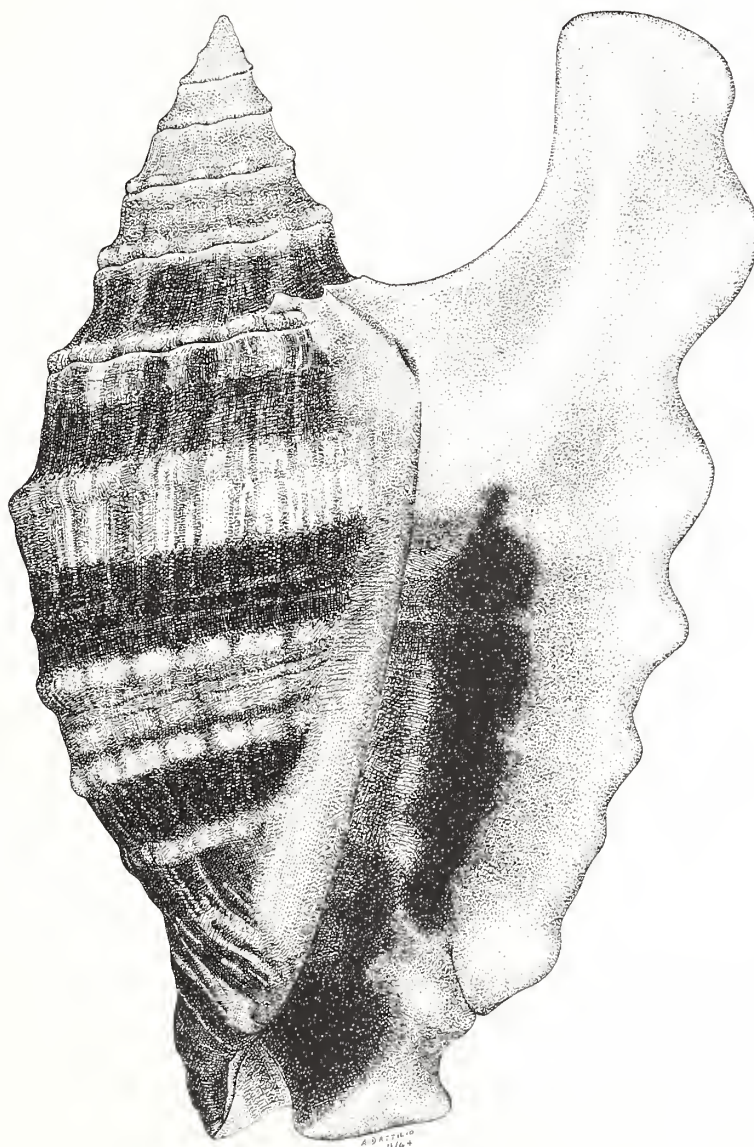


Pteropurpura festiva (Hinds, 1844), logo of the San Diego Shell Club.
Pen and ink drawing by Anthony D'Attilio in 1964.

ACKNOWLEDGMENTS

The assistance of the following people in the preparation of this memorial issue is gratefully acknowledged. William K. Emerson and Donald Pisor lent D'Attilio drawings. The San Diego Natural History Museum made the photograph of Anthony D'Attilio available and Stanford University Press gave their

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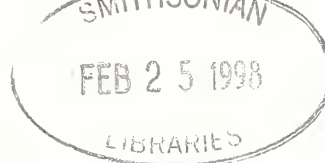


Strombus oldi Emerson, 1965

Pen and ink drawing by Anthony D'Attilio in 1964.

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THE FESTIVUS

A publication of the San Diego Shell Club

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Meeting date: third Thursday, 7:30 PM
Room 104, Casa Del Prado, Balboa Park

PROGRAM

Progress on the NE Pacific Gastropod book and a Revision of the Worldwide Liotiinae

Dr. James H. McLean, Curator of Malacology at the Los Angeles County Museum of Natural History, will talk on his upcoming book and will show samples

of what he has done so far. He will also show slides and discuss his revision of the subfamily Liotiinae which has been in need of work for many years.

Meeting date: 19 February 1998
Shells of the month: Liotiids and Trochids

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting - January 15, 1998

President Wes Farmer called the meeting to order at 7:45 p.m. The minutes were approved as published in *The Festivus*. Guests were welcomed. One, Jaelyn Chock, an independent contractor for the Navy, addressed the group on her work preparing a database of flora and fauna of San Diego Bay. She is interested in any data from that area.

Carole Hertz announced that this year's auction will be on Saturday, April 25th. Some of the terrific stuff for auction includes a *Cypraea armeniaca* "Westralian form" and a mint copy of Abbott's *American Seashells*, 2nd edition. Wes announced that a volunteer is still needed for the Club's Botanical Garden Representative.

Due to a slide projector problem, a break for refreshments was held before the speaker's presentation. After the break, Don Shasky introduced Kaustov Roy, Assistant Professor of biology at UCSD, who spoke on Fossil and Recent Strombus. He has collected data for over ten years on biological diversity from Alaska to northern Peru and he thanked our Club for providing valuable information through *The Festivus*. He provided a geological history of strombids and discussed the wide variety in their morphology and the span of body sizes. It is not known if Strombidae and Aporrhaidae are really distinct families. It was interesting to learn that some strombids remain under the sediment for six months, possibly filter feeding. He added that although it has not been published, the first *Strombus* species was found in Jamaica over 65 million years ago. Since the early periods, there are fewer species of Aporrhaidae and more species of Strombidae. The strombids move a lot faster and this escape locomotion may contribute to the greater occurrence of *Strombus*. As with many other species, the greatest diversity is found in the Indo-Pacific.

The meeting was adjourned at 9 p.m. The shell drawing was won by Twila Bratcher-Critchlow and refreshments were brought by Carole and Jules Hertz and Wes Farmer.

Silvana Vollero

Recent Donations to the San Diego Shell Club

Several generous donations to benefit the San Diego Shell Club and *The Festivus* were made in

December of 1997 by members Kirstie Kaiser, Carol Skoglund and Virginia Upton. A donation to cover the cost of the color cover of the supplement to Volume XXIX was sent by Kirstie Kaiser; an assortment of over 30 books and booklets on mollusks was donated by Virginia Upton; and fine camera equipment was received from Carol Skoglund, some of which will be used for the preparation of future photos for *The Festivus* and the rest sold with the proceeds to be used to further projects of the Club's publication.

The Club is grateful not only for these unselfish donations, but for the sentiments which must have generated them.

Supplement to Volume XXIX Available for Sale

The over 65-page supplement to Volume 29 by Kirstie Kaiser entitled *The Recent Molluscan Marine Fauna of the Islas Galápagos* is available for sale. Over 800 species from the intertidal to deep water are included with two annotated appendices, one enumerating accepted species and the other rejected species. This supplement updates previous compilations of the marine molluscan fauna of the Archipelago and includes "documented records, deep-water occurrences, data on endemism and biogeographic relationships."

To order, send \$16 (domestic); \$20 (overseas surface) and \$25 (overseas air mail) to the San Diego Shell Club in care of the Club address.

The '98 Auction Date Set

Mark your calendars. The Club's annual Auction/Potluck will be held on Saturday evening April 25th in the community room of Wes Farmer's condo. It's not too early to be preparing your donations for the auction. Please be generous -- the auction can only be as good as the material donated. Remember that your donations support the Club's fine library, contributions to scientific projects such as the Science Fair and *The Festivus*. Bring your donations to the meeting or contact a board member and arrange for pickup.

In Memoriam

Charles "Tommy" Thomas
1914-1998

AN INFESTATION OF *POMACEA CANALICULATA* (LAMARCK, 1804)
IN LAKE MIRAMAR, SAN DIEGO, CALIFORNIA

RICHARD CERUTTI

Department of Paleontology, San Diego Natural History Museum,
P.O. Box 1390, San Diego, California 92112, USA

On Sunday 29 June 1997, I took my two sons fishing to Lake Miramar, a city water reservoir located near Miramar Naval Air Station, a half mile east of Interstate 15 (Figure 1). While they were fishing on the north side of the lake, I spotted a large snail crawling on the bottom of the lake under the pier in about eight feet (2.5 m) of water. With its large size, globular shape, long antennae and its fast rate of speed, the snail looked totally different from any other freshwater snail that I had collected in other San Diego lakes or rivers.

I tried unsuccessfully to capture the snail with a net.

It looked like the snail had dug itself into the mud. My son, David, tried to find the snail by diving into the lake with no success. Then a boy on the pier showed me a large snail shell he had found earlier while fishing on the south shore of the lake, and I was quite shocked when I saw it because I remembered seeing live large freshwater snails like that one in an aquarium supply store in La Mesa (San Diego County) about four years ago. I also remembered asking the clerk for the species name and he told me that he only knew them as “mystery snails.”

By this time, all the kids on the pier had stopped fishing and started looking for snails. One boy spotted a live snail clinging to the base of a tule reed plant. And I was so determined to collect one of these snails that I jumped into the lake and grabbed it. The snail looked like an adult with a shell 70 mm in length. The shell was globular in shape with five whorls and a wide ovate aperture with an operculum. The color of the shells ranged from olive green to yellowish brown. Later that day I was able to collect another live snail, 60 mm in length, and two dead snail shells on the south shore of the lake. I put the two live snails in a large bottle with some aquatic plants from the lake to keep them alive for study.

While at Lake Miramar I had also noticed numerous bright red egg clusters attached to tules and rocks all around the lake above water level. I suspected that these eggs belonged to the large snails found in the lake and I collected three egg clusters attached to the tules for identification. I brought the eggs to David Faulkner, entomologist at the San Diego Natural History Museum, who said the eggs definitely were not insect eggs.

On 4 July, one of the live snails I had collected laid a cluster of bright red eggs identical to the clusters I had seen attached to the tules and rocks in the lake. The

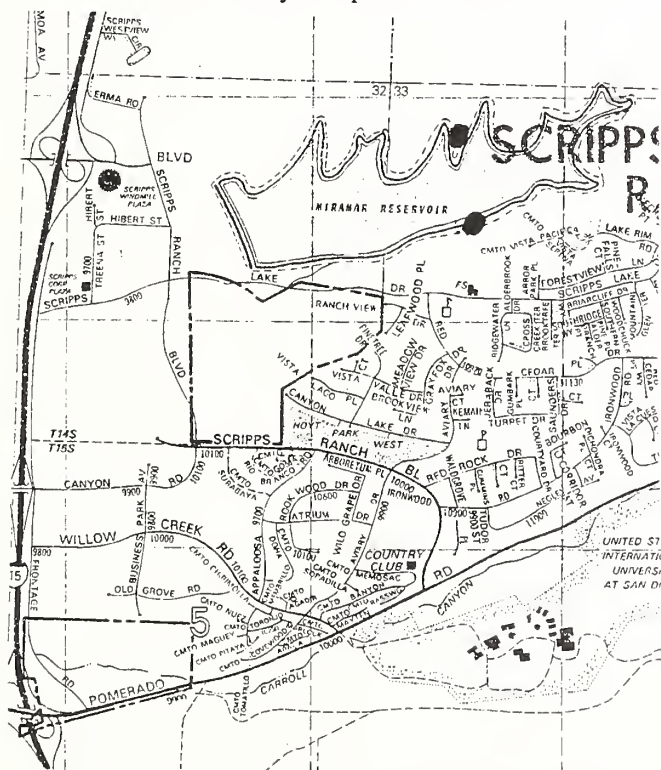


Figure 1. Map showing location of Lake Miramar. Two circles at the Lake show sites where specimens were first found.



Figure 2. *Pomacea canaliculata* (Lamarck, 1804), two views of a live ± 70 mm specimen taken from Lake Miramar. Photo: Margo Rausch.

eggs were laid at night out of the water, on the neck of the bottle. Over a period of sixteen days, one or both of the snails laid a total of five clusters of eggs, with more than 150 eggs per cluster. On 25 July, one of the clusters started turning white in color and the eggs began to hatch. Under the microscope, the eggs looked like bird eggs with a hard, brittle shell, and 3 mm-sized young snails with opercula hatched from them.

I returned to Lake Miramar on 7 September and photographed a living snail found in two feet of water and the egg cases above the water line on the tules all west of the boat docks along the south shore of the Lake (Plate 1, figures 1-3).

Carole M. Hertz, Associate in the Department of Marine Invertebrates, felt that the snails were ampullariids close to *Pomacea* and probably had been dumped into the lake by someone emptying an aquarium. She suggested sending specimens from the lake to Dr. Barry Roth, Research Associate, California Academy of Sciences, who concurred that the shells were a species of *Pomacea* (Ampullariidae). Dr. Roth said that aquarium hobbyists have been responsible for many troublesome introductions and suggested sending specimens to Dr. Robert H. Cowie, Associate Malacologist at the Bishop Museum, Honolulu, Hawaii, who is working on problems associated with introduced mollusks.

Carole wrote to Dr. Cowie and he agreed to look at the snails. He identified the two specimens, now in the Bishop Museum collections (BPBM 253298), as the South American species, *Pomacea canaliculata* (Lamarck, 1804). He said that the snail has probably been brought to the U.S. mainland by the aquarium trade and that it has already been reported in Texas and

possibly in Florida. He added that the snail is a very voracious plant feeder, being an extremely serious pest of wetland rice crops in southeast Asia and of wetland taro in Hawaii. Dr. Cowie suggested that "the authorities in California be on the lookout [for this pest] and try to prevent its further spread" since it "could drastically change the aquatic flora of a lake, pond or reservoir." For an article on the *Pomacea* snails in Hawaii, describing their introduction, life style and the destruction they have caused, see Christopher Alpha's (1993) article, "Alien Snails Threaten Hawaiian Wetland Ecosystems" in *Hawaiian Shell News* 41(12): 1-5.

By the amount of eggs that I have found around the lake and the number of snails that can easily be spotted (on 18 July I collected five live snails in an hour using only a stick and not getting wet), I would suggest that *Pomacea canaliculata* is well established in Lake Miramar and can be considered an infestation.

When talking to my brother about apple snails in Lake Miramar, he told me that a supermarket-sized pet store in Chula Vista (San Diego County) was selling large, live, freshwater snails called "apple snails" for \$14.00 apiece. I checked out the store on 23 September and the snails appear to be identical to the *P. canaliculata* found in Lake Miramar. I also purchased a dead specimen of a golden-colored *Pomacea* in an aquarium supply store in La Mesa, California. This specimen, too, was sent to Dr. Robert Cowie for identification and he called it a form of *Pomacea canaliculata*. It is now in the Bishop Museum collections (BPBM 253515).

This is the first report of *Pomacea canaliculata* in California. It is not yet known what effects this species

will have in Lake Miramar. Dr. Cowie wrote that now "Hawaii prohibits the import of all species of *Pomacea* except by government agencies under special permit. Since this regulation came into effect, no permits have been applied for." Perhaps similar work should be done here to prevent the spread of this destructive snail in California. Other introduced species of freshwater mollusks such as the Zebra Mussel and the Asiatic Clam have proved to be serious pests in freshwater systems of the United States.

ACKNOWLEDGMENTS

My brother, Dan Cerutti first told me about the commerce in apple snails; Margo Rausch took some of

the photographs of the shells; several kids, Matthew Walters, Joe Saldivor and my sons Alvin and David Dejan, helped in the collecting and my wife, Aida, put up with stinky snails in our apartment for a month. To them all I am grateful. My thanks to David Faulkner for looking at the eggs and to Scott Rugh for helpful suggestions concerning identification. My appreciation to Carole Hertz for her kind help in getting the mollusks identified and encouraging me to write this paper, to Dr. Barry Roth for his information and to Dr. Robert Cowie for identifying the species, giving background and comments on the problem and reviewing the manuscript.

1998 LOW TIDES FOR THE NORTHERN GULF OF CALIFORNIA

The entries below show periods of low tides of -4.0 feet and below. The times of low tides are given in Mountain Standard Time. To correct for San Felipe, subtract one hour

from listed times which are for Puerto Peñasco (San Felipe is on Pacific Standard Time). Tides below the midriff of the Gulf cannot be estimated using these entries.

February 10	-4.0 ft. at 6:30 p.m.	April 10	-4.0 ft. at 7:30 p.m.	June 25	-4.1 ft. at 9:10 a.m.
February 11	-5.0 ft. at 7:00 p.m.	April 11	-4.5 ft. at 7:40 a.m.	July 24	-4.0 ft. at 7:50 a.m.
February 12	-5.2 ft. at 8:00 p.m.	April 12	-4.1 ft. at 8:10 a.m.	August 22	-4.0 ft. at 7:50 a.m.
February 13	-4.0 ft. at 9:00 p.m.	April 26	-4.4 ft. at 7:10 a.m.	August 23	-4.0 ft. at 8:10 a.m.
March 10	-4.0 ft. at 6:40 p.m.	April 27	-5.0 ft. at 8:00 a.m.	October 19	-4.0 ft. at 7:10 p.m.
March 11	-4.4 ft. at 7:20 p.m.	April 28	-4.7 ft. at 8:30 a.m.	November 4	-4.1 ft. at 7:00 p.m.
March 12	-4.0 ft. at 7:40 a.m. -4.7 ft. at 8:00 p.m.	April 29	-4.1 ft. at 9:10 a.m.	November 5	-4.1 ft. at 7:50 p.m.
		May 9	-4.0 ft. at 7:00 a.m.	November 18	-4.0 ft. at 7:50 p.m.
March 13	-4.2 ft. at 8:10 a.m. -4.4 ft. at 8:20 p.m.	May 10	-4.0 ft. at 7:20 a.m.	December 2	-4.0 ft. at 6:00 p.m.
		May 25	-4.3 ft. at 7:00 a.m.	December 3	-4.7 ft. at 7:00 p.m.
March 14	-4.0 ft. at 8:40 a.m.	May 26	-5.0 ft. at 7:30 a.m.	December 4	-4.6 ft. at 7:40 p.m.
March 29	-4.2 ft. at 8:30 a.m.	May 27	-4.6 ft. at 8:10 a.m.	December 5	-4.1 ft. at 8:30 p.m.
March 30	-4.1 ft. at 9:00 a.m.	May 28	-4.0 ft. at 9:00 a.m.	December 31	-4.0 ft. at 6:00 p.m.
April 10	-4.3 ft. at 7:00 a.m.	June 24	-4.1 ft. at 8:30 a.m.		

CYPRAEA TALPA ON EGGS AND A LIVE *CYMATIUM (GUTTURNIUM)*
MURICINUM, BOTH AT ISLA DEL COCO, COSTA RICA

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This is a report on some interesting occurrences of Indo-Pacific species found on the '97 Cocos Expedition, my ninth trip to this remote island. In March of last year, eleven divers boarded the *Undersea Hunter* to dive, dredge and photograph the marine fauna for eight days. Three of us were returning to continue research started on the first trip in 1984.

Although dead specimens of *Cypraea talpa* Linnaeus, 1758, had been found at Isla del Coco occasionally, only a few specimens had been found live (Shasky, 1983; Emerson, 1983). On a daytime dive at Isla Pájara, Isla del Coco (5°33'15.2"N, 87°03'13.5"W) in 82°F water, Clay Bryce, of the Western Australian Museum, and I dropped to 36 m (110 ft) to the sand bottom. As we moved to where the sand met the rocky slope, Clay turned over a large, 1 m long rock sitting in clean sand and light rubble. There, two specimens (68 and 65 mm) of *C. talpa* were clinging tightly to the underside of the rock. They appeared to be tending the eggs, a dense, hemispherical, light-yellow mass about 60 mm in diameter, the approximate length of one of the two specimens (Plate 1, figure 5). As I screeched, Clay immediately started photographing the active specimens. As a result of the disturbance, the two *C. talpa* moved to a more secure location on the underside of the rock. I

found their behavior very different from my observance of a different molluscan family. A very small *Octopus* species on its eggs in Bahía de Banderas, Jalisco, México, under no circumstances, through prodding or otherwise, would leave its egg mass which was attached to the inside of a valve of a dead bivalve. With previous records of living *C. talpa* and the finding of live specimens with eggs, it appears that the population of the Indo-Pacific species *C. talpa* is established at the Island.

A second surprising find was a live, mature (25.5 mm) specimen of *Cymatium (Gutturnium) muricinum* (Röding, 1798) found moving across clean sand and light rubble at 15.3 m (50 ft) in Bahía Chatham (5°33'44"N, 87°02'49"W) in water at 84°F during my first night dive of the trip (Plate 1, figure 7). This Indo-Pacific species is here newly recorded at Isla del Coco.

My thanks to Clay Bryce of the Western Australian Museum for the many fine photographs taken on the Expedition.

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Plate 1, figures 1-7. (Top row, l to r) (1) *Pomacea canaliculata* with animal extended, placed out of water for photo. (2) Egg clusters of *P. canaliculata*. (3) Close-up of egg clusters on tules. (Center row, l to r) (4) *Megathura crenulata* fleeing sea star *Astropecten sertulifera*. (5) *Cypraea talpa*, 2 specimens on eggs, one with mantle partly retracted. Photo: C. W. Bryce. (Bottom row, l to r) (6) *Astropecten armatus* with eulimids on dorsal surface. (7) *Cymatium (Gutturium) muricinum* moving across clean sand in 15.3 m. Photo: C. W. Bryce.

FOCUS ON MOLLUSKS (PREDATION ON MOLLUSKS BY SEA STARS)

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Fifteen years ago I was a serious shell enthusiast always keeping my eyes open for the elusive and beautiful mollusk. For example, in 1979, as a diving instructor at Club Mediterranee in Guadeloupe in the West Indies, I searched for the classic shape of the varices of *Pterynotus phyllopterus* (Lamarck, 1822) against the base of coral heads. After four months and countless dives I finally found my prize at the base of a coral head in 140 feet of water!

These days, as I make my living as a professional marine life and natural history photographer, I thought that in looking for the big three: whales, dolphins and sharks, my "search image" for mollusks must have deteriorated. For example, when I photographed the sea star *Astropecten armatus* Gray, 1840, at La Jolla Shores, La Jolla, California in the spring of 1995 (Plate 1, figure 6), I didn't even see the eulimids on the dorsal surface of the sea star until I got my film back. Perhaps their bright whiteness was reduced in my view finder at the 60-foot depth of the La Jolla marine canyon.

However in 1991, when a dramatic event unfolded at the North Island of Mexico's Los Islas Coronados with a *Megathura crenulata* (Sowerby, 1825) moving at

full speed as it was being chased by the sea star *Astrometis sertulifera* (Xantus, 1860) (Plate 1, figure 4), the dynamic behavior caught my eye. It was obvious that the *Megathura* was "fending off" the predator when it unfurled its mantle to protect itself from the advancing sea star. The mantle of the *Megathura* must have functioned as a uniformly slippery surface, making it difficult for the sea star to attach its tube feet and get a firm grip on the *Megathura*. It is likely that the *Megathura* eventually got away because the sea star did not appear large enough to overpower the *Megathura*.

Since then, in early September of this year, I did some photography for the Tatman Foundation's Channel Islands Research Project photographing small invertebrates in the sand communities of California's Channel Islands. I was transfixed by a massive *Bulla* mating episode, observed *Navanax* there to clean up the spoils, saw *Nassarius* sp. cruising and observed a particularly beautiful *Terebra pedroana* Dall, 1908. The excitement of observing these small sand-dwelling invertebrates was there in full force. To put food on the table, I still focus my photographic efforts on larger animals like sharks, dolphins and game fish, but perhaps my excitement for mollusks never really left.

Corrections: An error occurred in Skoglund (1997, *The Festivus* 29(8):69-75, "New Panamic Province Distributional Records for Thirteen Chiton (Polyplacophora) Species"). On page 69, column two under the genus *Ischnochiton*, please correct the following: delete the subgenus *Ischnoradsia* and replace it with the subgenus *Ischnochiton* s.s. I sincerely thank Richard van Belle for calling this to my attention.

Carol Skoglund

Two figures were inadvertently reversed in the Anthony D'Attilio Memorial Issue [Vol. XXX(1):11]. *Pteropurpura benderskyi* should be on the left and *Murexiella radwini* on the right.

Carole M. Hertz

MEETING ANNOUNCEMENTS AND REPORTS

Report on the Second Annual SCUM Meeting

The second annual meeting of the Southern California Unified Malacologists (SCUM) met at the Los Angeles County Museum of Natural History on Saturday morning, 10 January 1998 with over 25 attendees. The informal gathering of professional, amateur and student malacologists, hosted by Jim McLean and Lindsey Groves began at 10 a.m. with coffee, soft drinks, cakes and muffins provided.

Those in attendance were from San Diego to Santa Barbara and after a round of introductions, some gave formal short presentations with slide accompaniments, though most gave brief synopses of work in progress including: David Jacobs, at UCLA, working on photosymbiosis in bivalves such as *Mercenaria* at Friday Harbor; George Kennedy, of SDSU, studying the sediments dredged below the Coronado Bay Bridge in San Diego, noting that key fossil mollusks show

that the area is middle Pleistocene and not Pliocene as has been thought by some; Doug Eernisse, of Cal. State University, Fullerton, on dredged chitons off Diablo Canyon and preparation of a key to west coast chitons; Richard Squires, of Cal. State University, Northridge, studying the Paleocene and Eocene of Simi Valley and with his students working on a practical field guide for paleontology and Jim McLean giving an overview of his upcoming book and his revision of the Liotiinae.

The group broke for lunch and more informal conversation with friends and co-workers. The relaxed discussions resumed later, lasting until 2 p.m. at which time Jim and Lindsey made the LACM's Recent and fossil mollusk reference collections available to those present. It was a most stimulating and enjoyable day.

It is planned that next year's meeting will be in San Diego.

Carole M. Hertz

Announcement of the California Paleontology Conference

The California Paleontology Conference will be held from April 17-19, 1998, at UCLA. The conference will bring together paleontology and evolutionary biology enthusiasts throughout California. There will be 10-15 minute talks and posters. Abstracts will be published in the journal *Paleobios*.

There will be a reception for participants on April

17th, talks and posters and a conference dinner on the 18th with a field trip on the 19th. For more information and registration forms, contact Michael Vendrasco, Dept. of Earth & Space Sciences, UCLA 90095-1567, Phone: (310) 442-0866, FAX: (310) 825-2779 or e-mail: mikev@ess.ucla.edu. For updated CalPaleo information and registration form: <http://www/ess/ucla.edu/~mikev/calpaleo98.html>.

International Zebra Mussel & Aquatic Nuisance Species Conference

The 8th International Zebra Mussel and Aquatic Nuisance Species conference will be held in Sacramento, California, from 16-19 March, 1998, hosted by the California Sea Grant College System. The theme will be the ecology, prevention and management of zebra mussels and aquatic nuisance species. Special room rates at the Sacramento Double

Tree Hotel (\$77) are available for conference attendees until 15 February.

The conference website is <http://www.zebraconf.org>. For additional information about the conference, contact Elizabeth Muckle-Jeffs, 567 Roy St., Pembroke, Ontario K8A 6R6, Canada' Phone: 800-868-8876 or e-mail: profedge@renc.igs.net.

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THE FESTIVUS

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Meeting date: third Thursday, 7:30 PM
Room 104, Casa Del Prado, Balboa Park



PROGRAM

Bringing the Santa Barbara Channel to the World

Paul Scott, Senior Associate Curator of Invertebrate Zoology at the Santa Barbara Museum of Natural History, will give a slide program on the southern California marine environment.

He will focus, too, on the Taxonomic Atlas series published by the Santa Barbara Natural History Museum. Paul has also offered to help identify members' problem NE Pacific bivalves.

Meeting date: 19 March 1998
Shells of the month: Deep water southern California shells

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CLUB NEWS

Minutes of the

San Diego Shell Club Meeting - February 19, 1998

President Wes Farmer called the meeting to order at 7:30 p.m. The minutes of the January meeting were approved as published in *The Festivus*.

Everyone was reminded that the Auction is coming up in April [see below]. Donations are needed and, as always, specimens with data are preferred. A signup sheet was passed around for contributions to the potluck dinner.

Bill Romer displayed the pictures from the Christmas party. Plans for this year's Science Fair are being arranged. The judges have been selected. Jules Hertz announced that the board agreed to make a \$300 donation to the WSM student grant fund. Don Shasky announced that Paul Scott will be the March speaker.

Don introduced the speaker for the evening, Jim McLean, Curator of Malacology at the Los Angeles County Museum of Natural History who studied under Myra Keen. He announced that his new book on gastropods of the northeastern Pacific from the Arctic to Baja is nearing completion. It treats 1200 species including 200 new ones. He brought his manuscript for people to view.

His main topic was the Liotiinae, a group he has been working on for a long time. The thick lip and beaded operculum are characteristic of the group. He showed slides of many new species and genera. One especially bizarre and beautiful species found in deep water off the central Indo-Pacific is *Stellarina magnifica*. This subfamily is not found in the Mediterranean or other parts of Europe. His program was enjoyed by all.

Thank you to the Schneiders and the Hutsells for the delicious refreshments for the evening. The winner of the shell drawing was Terry Arnold.

The meeting was adjourned at 8:45 p.m. for refreshments, socializing and perusing the copies of journals and books for sale.

Silvana Vollero

Changes to the Roster

Additions and corrections

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The Club's Annual Auction/Potluck

Saturday evening April 25th the Club's annual Auction/Potluck will be held in the community room of Wes Farmer's condo, as it has been for the last number of years. This is the Club's biggest social event and fundraiser of the year and your help is needed to make it a success.

The auction supports many Club activities: participation in the Greater San Diego Science and Engineering Fair, contributions to student grants for worthy students in malacology, the Club library, special Club events, and the publication of *The Festivus* and its supplements.

Please look through your collections and prepare your donations for the Auction. The event is only as good as the material to be auctioned. If you cannot attend the March meeting, contact a board member and arrange for pickup of your auction donation. The signup sheet for the potluck will be passed again at the March meeting. If you have further questions, call Carole Hertz (619) 277-6259.

A map to Wes' condo will be in the April issue.

IN MEMORIAM
VIVIENNE SMITH

COLUBRARIA (COLUBRARIA) OCHSNERI AND *COLUBRARIA (C.) LUCASENSIS* FROM ISLA DEL COCO, COSTA RICA

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The reported distribution for *Colubraria (Colubraria) ochsneri* Hertlein & Allison, 1968, as summarized from Keen (1971) and Skoglund (1992), is Isla del Malpelo, Colombia; the Islas Galápagos, Ecuador; and L'île Clipperton, France. The junior author collected specimens of this species at Isla del Coco, Costa Rica, during her eight visits there, from 1985-1997. The animals were common in depths of 12-24 m (40-80 ft), in sand under rocks. The species was not reported in previous checklists of mollusks collected at Isla del Coco (Montoya, 1983; Shasky, 1989a,b). Figures 1 and 2 show a large specimen in the K. L. Kaiser Collection from Isla del Coco.

In overall appearance, *Colubraria (Colubraria) ochsneri* is similar to *C. (C.) lucasensis* Strong & Hertlein, 1937, with *C. (C.) lucasensis* having a much wider distribution, as summarized by Keen (1971) and Skoglund (1992). *C. (C.) lucasensis* was described from off Cabo San Lucas, Baja California Sur, México, and it has been reported from Guaymas, Sonora, México, south to Panamá, the Islas Galápagos, and Isla del Malpelo. Shasky (1988) reported finding a specimen off Isla La Plata, Ecuador. *C. (C.) lucasensis* is a variable species within its distribution. Emerson & D'Attilio (1965) reported that specimens of *C. (C.) lucasensis* from the Islas Galápagos "possess a narrower, less inflated shell than the holotype of the taxon," a single, inflated, juvenile specimen dredged off Cabo San Lucas, Baja California, México. They also examined specimens from Arena Bank in the Golfo de California, from off Pta. Judas, Costa Rica, and from the Canal Zone of Panamá, and found them to be stouter

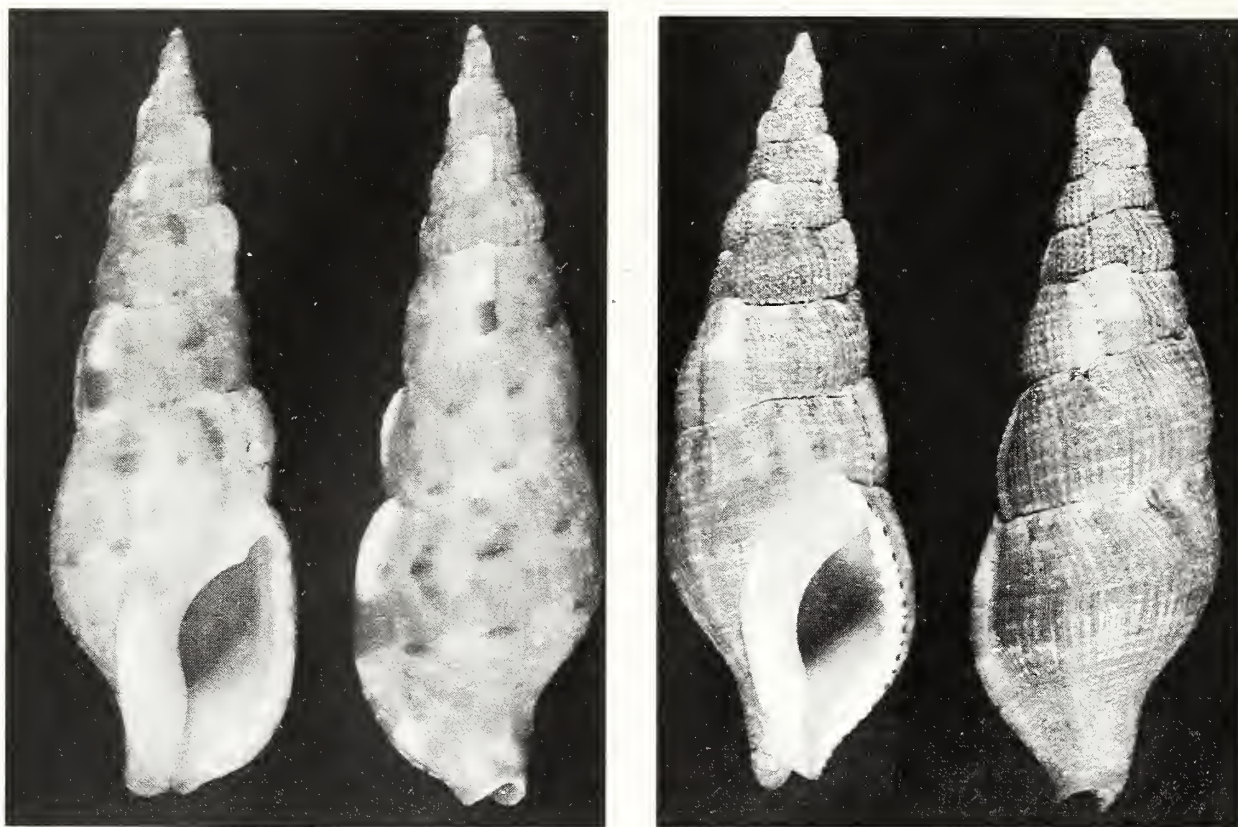
and more inflated than Galapagan specimens.

Figures 3 and 4 show a 42.5 mm specimen of *C. (C.) lucasensis* that the junior author found at Playa John Huston, Báhia de las Banderas, Jalisco, México, at a depth of 9 m (30 ft), in clean sand under a boulder, in 25.6°C (78°F) water. In addition to being a somewhat larger shell, *C. (C.) lucasensis* has some sculptural features which distinguish it from *C. (C.) ochsneri*. Per Keen (1971), *C. (C.) lucasensis* is a brownish shell, "the nuclear whorls glassy, the remainder cancellately sculptured and spotted or streaked with darker and lighter color," whereas *C. (C.) ochsneri* is "light brown with a darker medial concentric band, above and below which on the body whorl are small brown spots in a spiral row; varices one per whorl, lighter in color but with brown spots corresponding to the bands. Sculpture regularly cancellate; outer lip with paired lirae within, inner lip with a broad, smooth, white callus."

The most distinctive differences we have found between *C. (C.) ochsneri* and *C. (C.) lucasensis* are in their protoconchs and external sculpture. We have examined the holotype and three paratypes of *C. (C.) ochsneri* that were figured by Hertlein & Allison (1968) that are currently housed at the University of California Museum of Paleontology, Berkeley, California. All four specimens are quite worn, and only paratype no. 37129 has a good portion of its protoconch remaining. The complete protoconch of *C. (C.) ochsneri* has not been previously figured. Campbell (1961) in his summary of Colubariidae of tropical west America illustrated the protoconch of *C. lucasensis* containing a nucleus of four whorls. Hertlein & Allison's original

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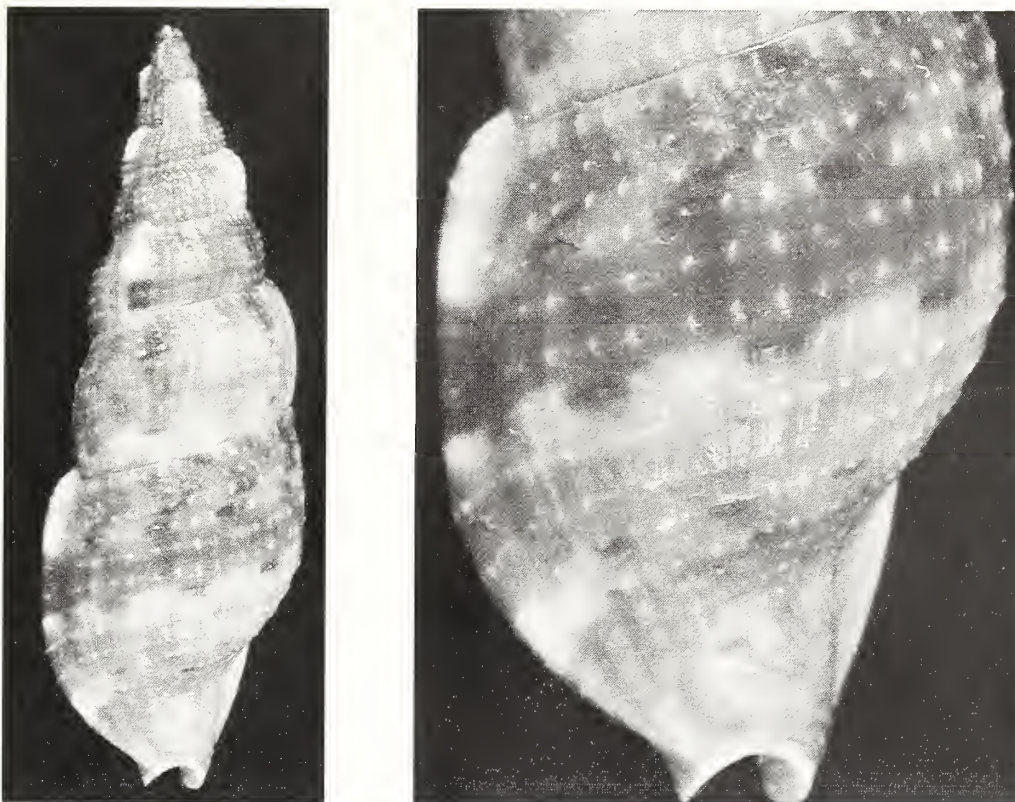


Figures 1-4 (left to right). (1) *Colubraria (Colubraria) ochsneri* Hertlein & Allison, 1968, apertural view, east side of Isla Manuelita, Isla del Coco, Costa Rica, 20 April 1987, 11-18 m, in coral heads with sand, length 33.0 mm, leg. K. L. Kaiser. (2) Dorsal view of specimen in Figure 1. (3) *Colubraria (Colubraria) lucasensis* Strong & Hertlein, 1937, apertural view, Playa John Huston, Bahía de las Banderas, Jalisco, México, January 1994, 9 m in sand under big, round stone, length 42.5 mm, leg. K. L. Kaiser. (4) Dorsal view of specimen shown in Figure 3. Photos: D. K. Mulliner.

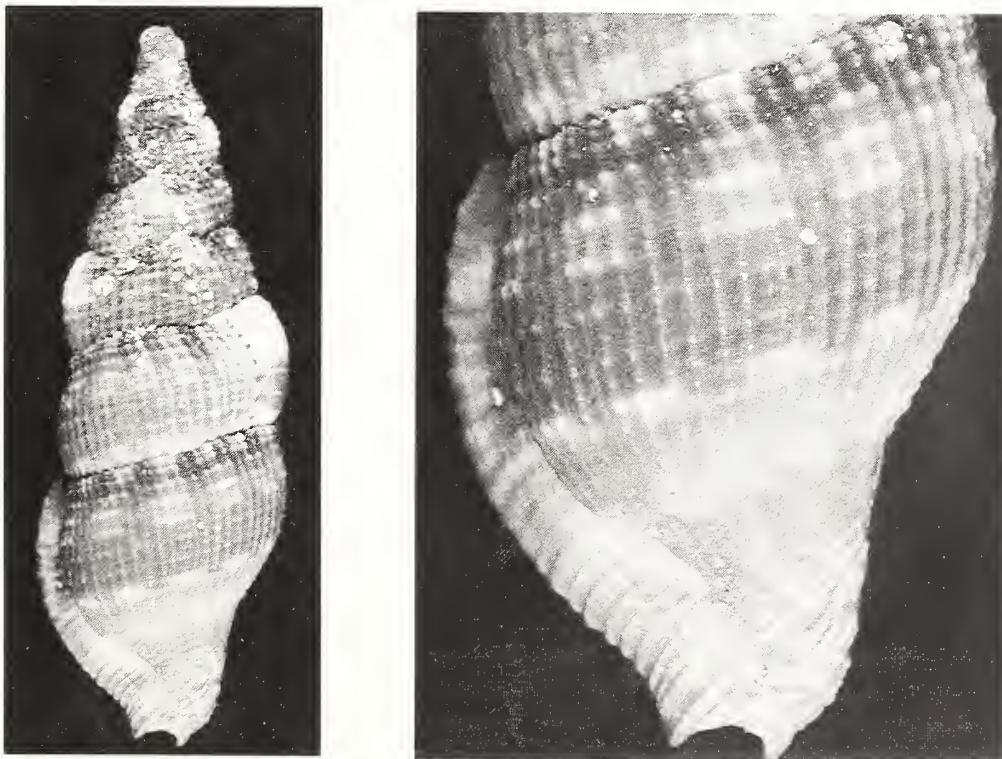
description remarked "that on *C. ochsneri*, new species, the interspaces between the node-bearing concentric spirals are sculptured with fine spiral striae of nearly equal size whereas on *C. lucasensis* the corresponding spiral striae are somewhat coarse and among them one thread is coarser than the others." Our observations indicate approximately eight weak spiral striae between node-bearing concentric spirals on *C. (C.) ochsneri* (Figures 5 and 6) and two to three stronger spirals in the interspaces between major node-bearing concentric spirals on *C. (C.) lucasensis* (Figures 7 and 8). On the body whorl of both species the nodes are aligned both concentrically and axially. In *C. (C.) ochsneri* the nodes are weak and the relative prominence of the concentric spirals and the axial rows are variable, although most often they are approximately equal in strength. The nodes on the body whorl of *C. (C.) lucasensis* result in strong axial rows and weaker concentric spirals. Figure 9 is a drawing of the one paratype (no. 37129) of *C. (C.) ochsneri* which still has a partial protoconch, and Figure 10 shows a portion of

the dorsum of the body whorl of a second paratype (no. 37128). Figure 11 is a camera lucida drawing of the complete protoconch of a *C. (C.) ochsneri* specimen from Isla del Coco, and Figure 12 illustrates the sculpture on the dorsum of the body whorl of the same specimen. Observations of numerous specimens of *C. (C.) ochsneri* with complete protoconchs show that they have 3-3½ whorls and under high magnification raised spiral threads can be seen in or slightly above the sutures of the nuclear whorls. At the transition of the protoconch to the teleoconch, there is a series of parallel curved axial lines which sometimes result in a varix before the start of the first teleoconch whorl (Figure 9).

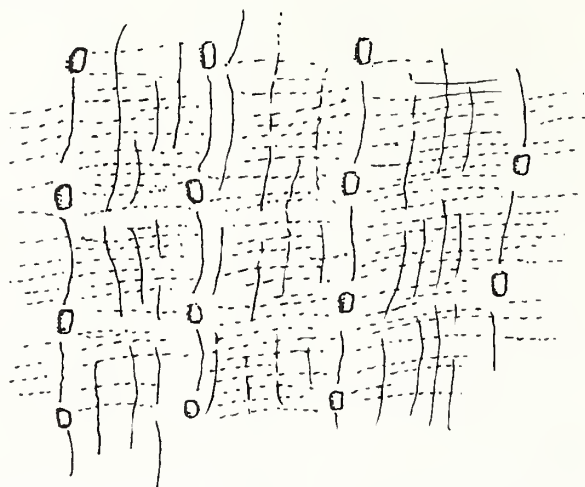
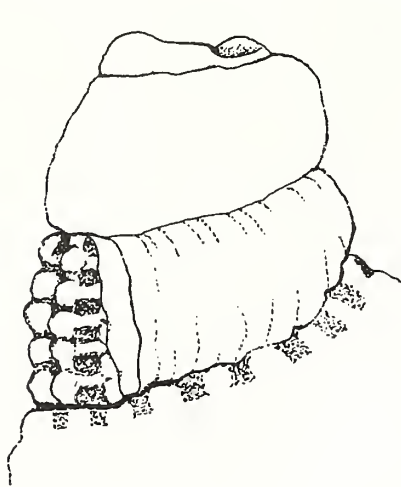
The protoconch of a *C. (C.) lucasensis* specimen from off Isla Danzante, Golfo de California, México, is shown in Figure 13. It has four whorls, although other protoconchs of *C. (C.) lucasensis* specimens that we have observed vary from 4-4½ whorls. Figure 14 shows a portion of the dorsum of the body whorl of a mature specimen of *C. (C.) lucasensis* from Bahía de las Banderas, Jalisco, México.



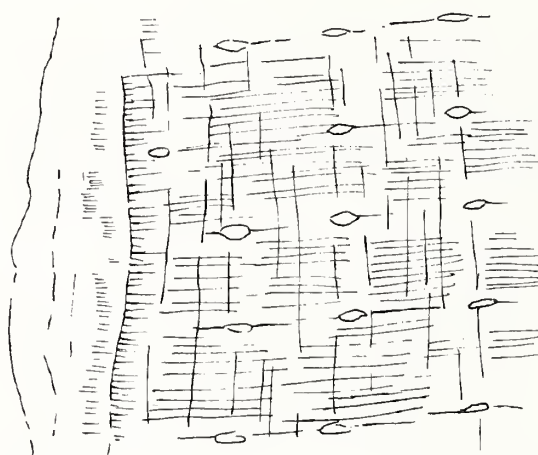
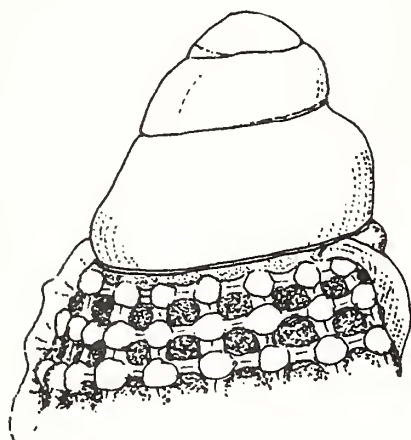
Figures 5, 6 (left to right). *Colubraria (Colubraria) ochsneri* Hertlein & Allison, 1968, dorsal view. Isla Dos Amigos, Isla del Coco, Costa Rica, 18-25 m, under coral closest to shore, 11 January 1991, length 33.4 mm, leg. D. R. Shasky. (6) Magnified view of body whorl of specimen in Figure 5 showing approximately eight weak spiral striae between node-bearing concentric spirals. Photos: D. K. Mulliner.



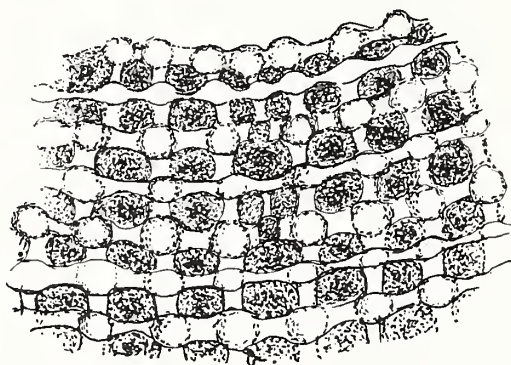
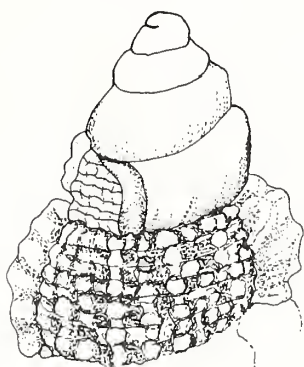
Figures 7, 8 (left to right). (7) *Colubraria (Colubraria) lucasensis* Strong & Hertlein, 1937, dorsal view, Isla Santa Cruz, Islas Galápagos, length 42.1 mm, D. R. Shasky collection. (8) Magnified view of body whorl showing two or three strong spirals in the interspaces between node-bearing concentric spirals. Photos: D. K. Mulliner.



Figures 9, 10 (left to right). *Colubraria (Colubraria) ochsneri*. (9) Camera lucida drawing of broken protoconch of paratype CASIZ 37129, California Academy of Sciences. Shell length 23.3 mm. (10) Portion (4 mm square) of dorsum of body whorl of *C. (C.) ochsneri*, paratype CASIZ 37128, shell length 27.3 mm. Camera lucida drawings: J. Gemmell.



Figures 11, 12. *Colubraria (C.) ochsneri* from ledges at 9-21 m, Isla del Coco, Costa Rica, 2 April 1992, leg. K. L. Kaiser. (11) Protoconch of specimen 18.0 mm. (12) Sculpture of portion (5.5 mm square) of dorsum of body whorl of second specimen from Isla del Coco, Costa Rica, 2 April 1992. Camera lucida drawings: J. Gemmell.



Figures 13, 14. *Colubraria (C.) lucasensis* Strong & Hertlein, 1937. (13) Protoconch of 17.1 mm specimen, off NE Isla Danzante, Golfo de California, México, dredged in 60-90 m, substrate sand and small rocks, 1979-1991, leg. P. & C. Skoglund. (14) Sculpture of portion (4 mm square) of dorsum of body whorl of mature specimen of *C. (C.) lucasensis* shown in Figures 3 & 4. Camera lucida drawings: J. Gemmell.

The first few teleoconch whorls of both species have very cancellate sculpture and are similar. In *C. (C.) ochsneri* some spiral lines become visible within the cancellate sculpture in the third teleoconch whorl, although on one specimen we observed it in the first teleoconch whorl. In *C. (C.) lucasensis* concentric striae do not appear until the later post-nuclear whorls.

The junior author has also found *Colubraria (C.) lucasensis* at Isla del Coco, although it is quite rare there and has not been previously reported. Figure 15 shows a mature specimen collected off Chatham Bay by tangle net at 91 m in March 1989.



Figure 15. *Colubraria (Colubraria) lucasensis*, from off Chatham Bay, Isla del Coco, Costa Rica, taken by tangle net at 91 m, leg. K. L. Kaiser, March 1989, length 23.2 mm. Photo: B. Draper.

ACKNOWLEDGMENTS

The authors are grateful to Carol Skoglund and Donald R. Shasky for the loan of study material, David K. Mulliner and Bertram Draper for the photographs and Joyce Gemmell for the drawings. Carole M. Hertz was extremely helpful in providing technical guidance and encouragement. We are indebted to Paul H. Scott of the Santa Barbara Museum of Natural History and Karen Westmore of the University of California Museum of Paleontology for arranging the loan of the types of *C. (C.) ochsneri*.

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A BIVALVE ODDITY FROM AN OREGON BEACH

EUGENE V. COAN

California Academy of Sciences, Department of Invertebrate Zoology,
Golden Gate Park, San Francisco, California 94118-4599, USA

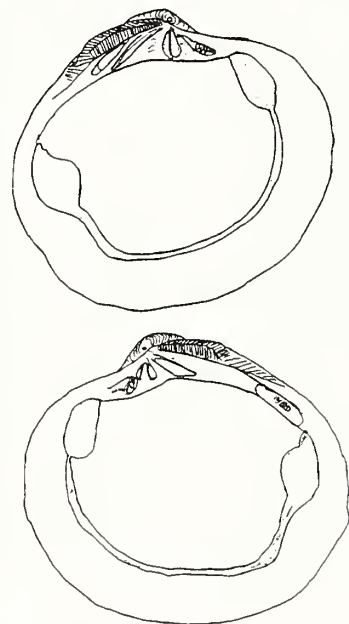
Whenever any non-malacologists I know is about to leave for a trip to a coastal locality, I ask them to pick up beach drift. Most of the time, the results are what might be expected, but you never know what will turn up. And this was the case when a friend returned from two weeks of camping at an obscure location on the Oregon coast.

Along with the expected *Petricola carditoides*, *Protothaca staminea*, and *Mytilus trossulus* was an intact set of paired valves of what looked, upon first examination, to be an unfamiliar venerid. It was only after considerable digging through the literature and asking around that I was able to confirm its identity. It is *Arctica islandica* (Linnaeus, 1767) [Arcticidae]. The specimen has been placed in the Santa Barbara Museum of Natural History (SBMNH 144382).

This clam, native to the North Atlantic, is now being harvested commercially and shipped all over the country (James T. Carlton, e-mail, 16 September 1997). What a set of paired valves was doing on a fairly remote beach in Oregon remains a mystery, but it probably got there by human transport, perhaps the remnants of a picnic.

This species native occurrence is from Norway to Spain, Iceland, and from Labrador to North Carolina, from the intertidal zone to 482 m on mud, sand or gravel bottoms. The species can attain 127 mm in length.

I report this find and figure the specimen here (Figures 1-3) to alert others to watch for this species and to help them in recognizing it.



Figures 1-3, *Arctica islandica* (Linnaeus, 1767). North side of Cape Kiwanda, Tillamook Co., Oregon; beach drift, early August 1997; Steve Smith; length = 44 mm. SBMNH 144382. (1) Exterior view of specimen. (2) Interior view (3) Same. Line drawings of hinge and pallial line.

NODIPECTEN ARTHRITICUS (REEVE, 1853), NEW DISTRIBUTION AND SIZE RECORDS

KIM C. HUTSELL

5804 Lauretta Street, #2, San Diego, California 92110-1670, USA

For a number of years, *Nodipecten arthriticus* (Reeve, 1853) was largely ignored as many collectors regarded this eastern Pacific species as a southern form of *N. subnodosus* (Sowerby, 1835) or possibly an intergrade between the latter and the Galapagan species, *N. magnificus* (Sowerby, 1835). Rombouts (1991: 47) lists *N. arthriticus* as a junior synonym of *N. noduliferus* (Sowerby II, 1842). In fact, no mention is made of *N. arthriticus* in such major works as Keen (1971) or Abbott (1974). So, the continued confusion over this species is understandable.

In October of 1996, while diving at Isla San Marcos, north of Punta Chivato, Baja California Sur, Rick Barilotti of Poway and George Barton of Oceanside, both in California, found a number of live *N. subnodosus* at a depth of 5 to 10 meters. Among the specimens, Barilotti noticed that one appeared different than the others and, upon returning from México, brought it to me for identification. There was no doubt that the specimen found at Isla San Marcos was *Nodipecten arthriticus*. Because of the location where the specimen was collected and because it was live-collected, the specimen establishes a new range extension for this species.

In 1991, I had collected a single valve of *N. arthriticus* measuring 92.2 mm at a depth of 19 meters on a reef off Cabo Pulmo, Baja California Sur, México (109°24'W, 23°24'N). The discovery went unpublished primarily because there was little evidence to indicate how the valve came to be at that location. Previous to that, the northernmost range for *N. arthriticus* was thought to be Islas Tres Marias, approximately 200 miles south of the reef at Cabo Pulmo (Smith, 1991). The existence of *N. arthriticus* at that location was confirmed by John Jackson of El Cajon, California, in May 1996, when he observed viable populations at Isla Maria Magdalena at 20 m and at Isla Maria Cleofas at 25 m.

Barilotti's discovery at Isla San Marcos extends the

known range approximately 500 miles northward. In addition to a new distribution record, the extraordinary size of Barilotti's live-collected specimen establishes a new size record for *N. arthriticus* at 137.1 mm. Since the left valve was badly eroded, only the right valve of this specimen is illustrated in Figure 1.

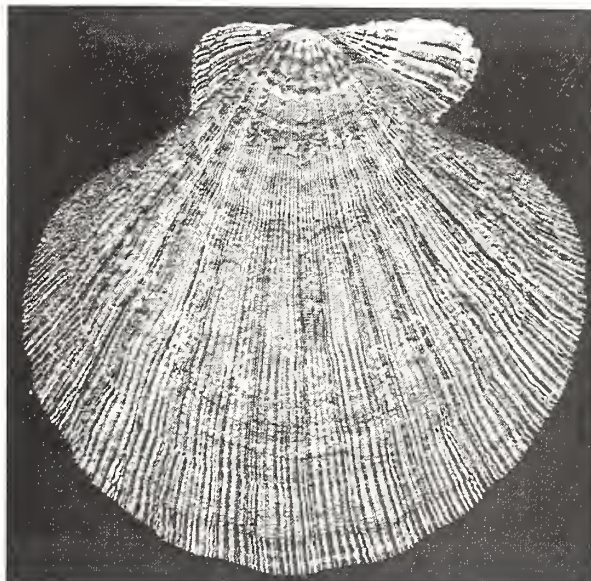


Figure 1. Right valve of *Nodipecten arthriticus* (Reeve, 1853). Length: 124.1 mm, width: 137.1 mm, collected at Isla San Marcos, Baja California Sur. Leg. R. Barilotti. Barilotti Collection. Photo: D. K. Mulliner.

While it is now generally accepted that *N. subnodosus* and *N. arthriticus* are separate and distinct, their geographic ranges overlap and it is yet unknown whether or not these two species have the ability to interbreed.

My appreciation to David K. Mulliner for the photograph of *N. arthriticus*.

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BOOK NEWS

An Illustrated Guide to the Unionid Mussels of Kansas
By: Karen J. Couch. 1997.

Published by: Karen J. Couch

Comb bound, i-ix + 124 pages, 49 color plates, 1 map
Price: \$56.95 plus \$4.00 shipping and handling [for domestic orders]

This guide to the mussels of Kansas is exquisitely illustrated by the author in mixed media, each species shown in a full-page plate in two to three views. For each species, Couch lists scientific name and author, common name, description, sexual dimorphism, size, habitat, known fish hosts, range, and similar species. This format is consistent throughout. Included, as well, are three families of non-unionid bivalved mollusks found in Kansas, with representatives of the Corbiculidae, Pisidiidae and Dreissenidae, also fully illustrated.

In addition to the 45 species treated, the book has an Introduction which gives interesting background information, on the freshwater mussels (naiades or unioniids) with historical information and facts about population, reproduction and collecting regulations. Also included is a map showing Kansas' river drainages, Glossary, Index to Common Names, Taxonomic Index, References and suggestions for Further Reading.

For those whose knowledge of bivalves is limited to the marine environment, such as this writer, the reading of Karen Couch's guide was an absorbing trip into a totally new setting. It would be a worthwhile venture

for the newcomer as well as those knowledgeable in freshwater fauna.

CMH

Identification and Management of the Exotic Sabellid Pest in California Cultured Abalone

By: C. S. Culver, A. M. Kuris & B. Beede. 1997.

Publication no. T-041, California Sea Grant College System, University of California, La Jolla, CA

36 pages, 10 illustrations (color and line drawings)

Price: \$6.00

This publication, as reviewed in the Nov.-Dec. 1997 California Sea Grant Extension Program Newsletter, discusses the problem of a shell-inhabiting parasitic worm native to South Africa which was inadvertently introduced to cultured abalone stocks in the late 1980s. The parasite, a sabellid or fan worm, was previously unknown here and while it does not affect the meat of the abalone, it causes the shell to cease growing or slow its growth.

The Newsletter notes that the publication summarizes what is known about the life history of the polychaete, the kinds of shell damage it causes, methods of detecting infestations and how it spreads including the susceptibility of other native marine species and recommendations for preventing its spread.

To order, make payment to the address above and send to the attention of Gretchen Frederick.

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THE FESTIVUS

A publication of the San Diego Shell Club

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Number: 4

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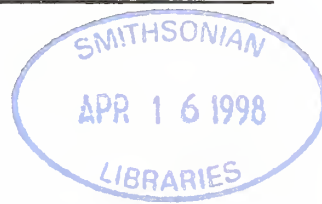
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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

COME TO THE AUCTION/POTLUCK

Saturday evening, April 25th
5 p.m. - ?

[See page 44 and map on last page for details.]
There will be no regular meeting this month.



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CLUB NEWS

Passing of Three Club Members

The Club is saddened by the passing of three members this month. Our sympathy goes to Billee Brown in the loss of her husband Bob, to Margenette Yeend whose husband Arthur died and to Bob King whose wife June succumbed [see page 47].

Minutes of the San Diego Shell Club Meeting - March 19, 1998

President Wes Farmer called the meeting to order with 28 people in attendance. The minutes of the February meeting were accepted as published in *The Festivus*. It was announced that member Bob Brown passed away recently. A brief treasurer's report was given by Margaret Mulliner and Carole Hertz gave a report on the upcoming auction and said that donations may still be made. [see col. 2].

Don Shasky introduced the speaker, Paul Scott, from the Santa Barbara Museum of Natural History. He discussed the museum's Taxonomic Atlas Series project. This collaborative effort has achieved international success and includes marine studies conducted since 1969. The project resulted in the discovery of 150 new species. It was found that the environment there is healthy and diverse perhaps, in part, due to the fact that the area includes a mixture of species from colder northern waters and warmer southern waters. Less diversity was found in shallower waters. Fourteen volumes have resulted from the project. The presentation was concluded with an invitation by Paul to visit the Santa Barbara Museum. Questions from the audience included a discussion of how the oil platform makes a good refuge for invertebrates. Nonetheless, they are being removed. Paul also very kindly offered to donate a copy of his upcoming book on the bivalves of the west coast of North America, coauthored with Eugene V. Coan, to the Club library.

The winner of the drawing was Chuck Reitz. Refreshments for the evening were contributed by Wes and Silvana Vollero. The meeting was adjourned at 8:30 p.m. to peruse the shells displayed, the completed volumes of the Taxonomic Atlas series brought by Paul, the literature for sale, and to enjoy the refreshments and conversation.

Silvana Vollero

Changes to the Roster

Change of address

Upton, Virginia (Ginny), 841 South Twelve Oaks Blvd., Chandler, AZ 85226; ph: 602-961-4552; email: conchas@primenet.com

New member

Wise, John B., Houston Museum of Natural Science, One Hermann Circle Dr., Houston, TX 77030-1799; ph: 713-639-4677; FAX: 713-523-4125

Too late for the roster

Library, Serials Unit, American Museum of Natural History, Central Park West at 79th St., NY, NY 10024
Cook, Bunnie & George, 1120 Makaiwa St., Honolulu, HI 96816, ph: 808-737-8050; email: g.-b.cook@juno.com
Hayes, Brian, PO Box 804, Port Elizabeth 6000, South Africa; ph/FAX: 27-41-334521; email: algoabay@sprintlink.co.za

Museum National d'Histoire Naturelle, Laboratoire de Biologie, Des Invertébrés Marins et Malacologie, 55, Rue de Buffon, 75005 Paris, France, ph: 01-40-79-30-89; email: Lozouet@MNH.fr

The Club's Annual Auction/Potluck

Saturday evening April 25th is the Club's annual Auction/Potluck. Festivities will begin at 5 p.m. with Dave's Punch and soft drinks while members and guests browse the voice auction table and silent auction tables. The potluck dinner will begin at 6 p.m. sharp and the auction will begin promptly at 7 p.m.

This is the last opportunity to donate to the auction if you have not already done so and to sign up for potluck contributions. Please remember that the auction provides the funding for much of the Club's activities and *The Festivus*, so be generous with your donations and come and have fun and buy. Guests are welcome.

There will be some wonderful "buys" at the auction in addition to the already noted *Cypraea armeniaca* "Westralian form," and mint copy of Abbott's *American Seashells* 2nd edition such as *Strombus listeri*, *Conus milneedwardsi*, a dredge and other rare books and shells. Bidding lists will be provided at the auction.

The map on the last page gives directions to Wes' condo and further details on the auction. If you have further questions or need to contact a member for donations, call Carole Hertz at 619-277-6259.

CALIFORNIA'S DEEP-WATER CALLIOSTOMAS

JOHN LAGRANGE

533 North Rios, Solana Beach, CA 92075, USA

In the fall of 1996, I made the acquaintance of Ms. Laurel Marinelli who was employed on the fishing vessel *Day Island* which was engaged in trapping Spot prawns (*Pandalus platyceros* Brandt, 1851) in deep water (200-300 m) off Catalina Island, California. I asked Ms. Marinelli to save some of the shells that come up in the traps for me. After checking the docks for the *Day Island* several times, I was surprised to get a phone call early this past summer from Laurel saying she had some shells for me. I met Laurel at the dock the next day and was pleased to find that she had collected, amongst other shells, more than thirty good specimens of deep-water *Calliostoma*. Some of the shells were crabbed, but quite a few were live collected and had been kept frozen. She had recorded the positions and depths where the shells had been found and also told me that many of the live specimens had been found adhering to the outside of the traps or the ropes rather than being inside of the traps. The locality was southeast of Catalina [33°15'N to 33°19'N and 118°12'W to 118°15'W] in depths of 207 to 305 m, which is the same area as the type locality for *Calliostoma titanium* and *C. bernardi*, both of McLean, 1984.

Upon examining the shells at home, I began having difficulties. There are three described species of California deep-water *Calliostoma* that are iridescent white with no color pattern: *C. platinum* Dall, 1890; *C. titanium* and *C. bernardi*. Dall's description of *C. platinum* includes:

"Shell large, thin, polished, iridescent white,...whorls slightly flattened behind the periphery, full and rounded on the base; longitudinal sculpture of obscure spiral lines behind the periphery and somewhat stronger flattish threads, separated by shallow grooves, on the base; at the periphery is a single prominent thread, immediately in front of which is the suture...Maximum longitude of the shell 32 mm..."

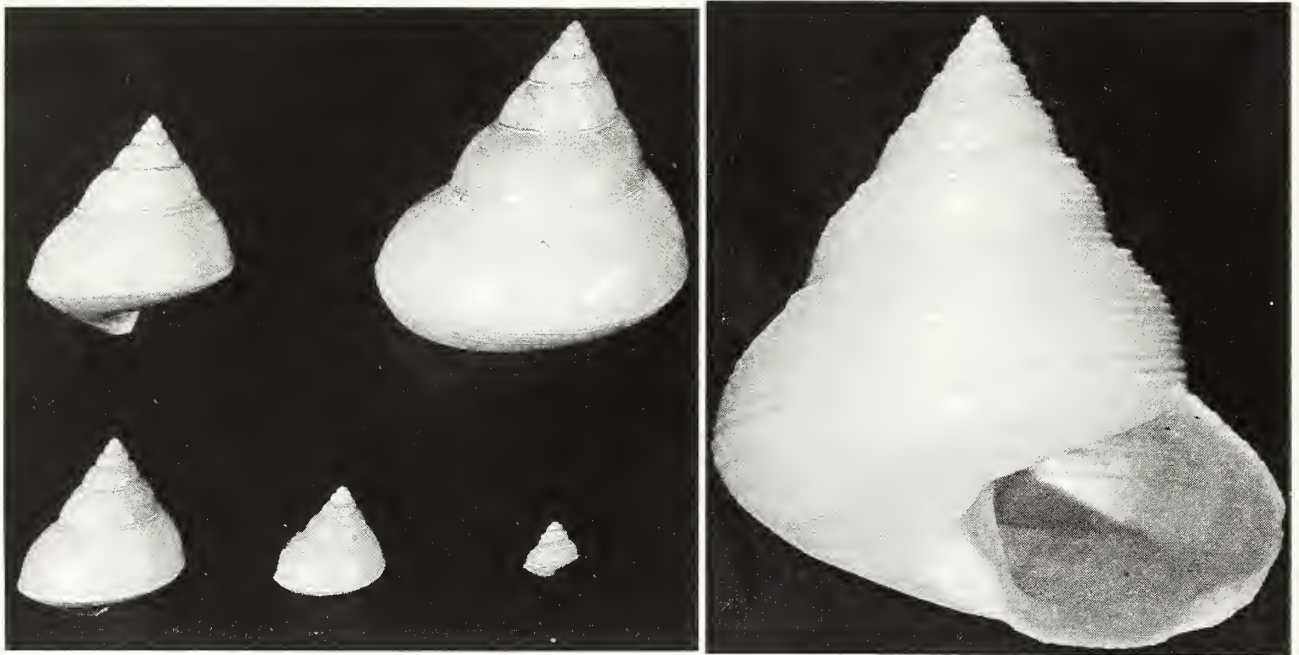
McLean's descriptions separate the species based on shell thickness, outline, whorl shape and surface sculpture. Examining the lot I had in hand, I found specimens that closely matched all three described species. When I tried to separate them into three piles I immediately ran into problems. There was considerable variation among the shells and there

seemed to be intermediates that confused the separation of the species.

At this point I showed the shells to Jules and Carole Hertz who agreed that it seemed difficult to separate them into three species and suggested we get an opinion from Dr. James H. McLean of the Los Angeles County Museum of Natural History. Dr. McLean graciously examined the specimens and commented that this is a much larger lot than was available for his original descriptions of *C. titanium* and *C. bernardi*. He agreed that they could not be separated into three species but he did divide them fairly convincingly into two species. One group were those shells matching Dall's description of *C. platinum* (Figures 1, 2), the other included shells within the range of variability of *C. titanium* and *C. bernardi*. There was one specimen that McLean hesitated to assign to either group.



Figure 1. *Calliostoma platinum*, LACM 152387. Apertural view of 29.5 mm specimen. Photo: D. K. Mulliner.



Figures 2 & 3. (2) *Calliostoma platinum*, LACM 152387. Growth series of 5 specimens: top row, left to right 15.5, 23.8 mm; bottom row, left to right 12.5, 7.8, 4.8 mm. (3) *Calliostoma titanium*, LACM 152388 (3) apertural view of 30.1 mm specimen. Photos: D. K. Mulliner.

On this basis I propose synonymizing *Calliostoma bernardi* with *C. titanium*, the latter name having page priority. I would amend the description of *C. titanium* to include: A variable number of spiral threads may be present on early teleoconch whorls, threads becoming more numerous and beaded on later whorls. A prominent strongly beaded cord is present just below the suture on all but the earliest teleoconch whorls. The periphery is sharply angled on juvenile specimens but can be quite rounded on the larger shells.

The shell of *Calliostoma titanium* (Figures 3-5) is heavier than *C. platinum* and tends to be more straight-sided, to a lesser extent showing the inflated whorl shape of *C. platinum*. *Calliostoma platinum* sometimes shows a strong thread at the periphery but it does not have the strong beaded cord below the suture, which is prominent on *C. titanium*. The finer spiral threads on the body whorl of *C. titanium* are also beaded, while those on *C. platinum*, if present, are not beaded. The size attained

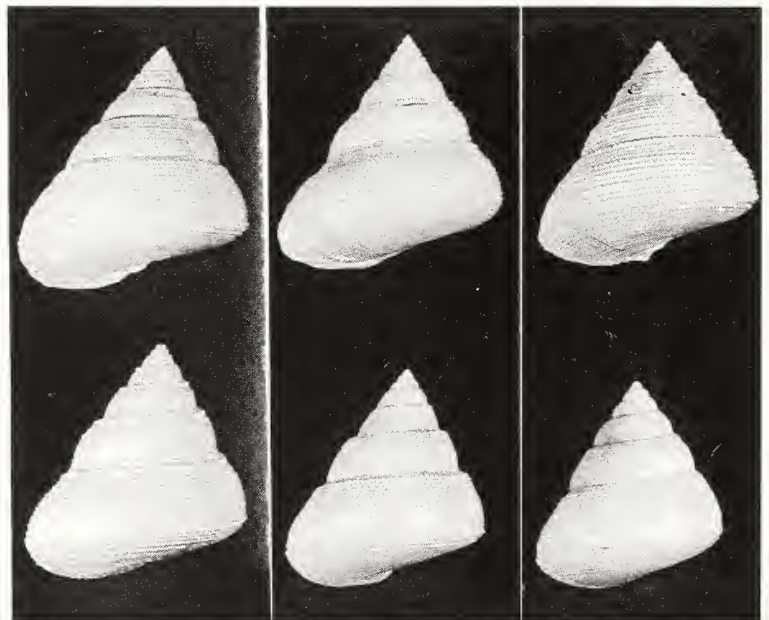


Figure 4. *Calliostoma titanium*, LACM 152388. Series of 6 specimens: top row, left to right 35.0, 33.1, 31.4 mm; bottom row, left to right 32.3, 30.1, 28.2 mm. Photo: D. K. Mulliner.

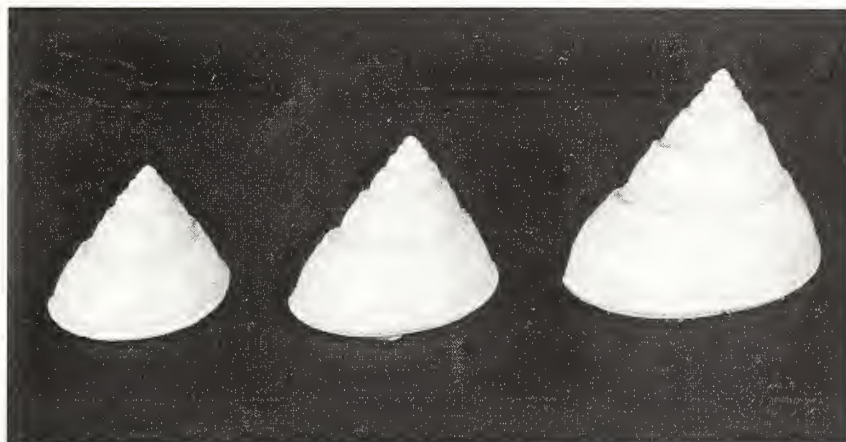


Figure 5. *Calliostoma titanium*, LACM 152388. Growth range of 3 small specimens, left to right 12.3, 13.5, 16.7 mm. Photo: D. K. Mulliner.

by *C. titanium* seems to be about the same as *C. platinum*, the largest specimens available measuring 38.4 mm in longest dimension, which is slightly more than the largest specimens of *C. platinum*. The *Calliostoma* specimens illustrated here have been donated to the collection of the Los Angeles County Museum of Natural History.

ACKNOWLEDGMENTS

I would like to thank Ms. Laurel Marinelli for saving the specimens for me and Dr. James H. McLean

for his help and advice. Mr. Dave Mulliner deserves thanks for his usual excellent job on the photographs and Carole and Jules Hertz were a great help with advice and editing.

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In Memoriam

June King
1918-1998

It is with sadness that we report the passing of June King of pulmonary failure. June, a longtime, active member of the San Diego Shell Club, was Recording Secretary in 1977, President in 1978, and generously donated her time to the Club, hosting several of the Club's annual events in her home. She was also an active volunteer in the Department of Marine Invertebrates at the San Diego Natural History Museum for many years. June had been fighting illness for the past several years and members missed her cheery presence. Our sympathy goes out to her husband Bob, four children, daughter-in-law, six grandchildren and one great-grandson.

BOOK NEWS

Mollusca: The Southern Synthesis. Fauna of Australia, Vol. 5. Vol. 5. Beesley, P. I., G. J. B. Ross, & A. Wells (eds). 1998. CSIRO Publishing: Melbourne, Part A, xvi + 563 pp., Part B, vii + 565-1234 pp. With a separate chart showing classification to the family level.

CSIRO Publishing, PO Box 1139, Collingwood, Victoria 3066, Australia. Price U.S. \$295 plus \$8 shipping and handling. The two volumes are not sold separately.

According to the publisher's announcement, there are contributions by 70 international authors; color photos of 200 living mollusks [in 37 plates, centered in each volume]; 500 black and white photographs [including SEM views of radulae], and over 2500 commissioned line drawings by 15 artists. The bibliographies cite 7700 papers in the primary literature. The volumes are hard bound with glossy paper finish, 8 x 12 inches, without dust covers. Cover illustrations are of Australian aboriginal art with schematic renditions of mollusks. Production values are superb. Text and illustrations are very carefully integrated. According to the Preface (p. v): "Reviews of all text and technical advice were provided throughout production by W. F. Ponder, F. E. Wells and A. J. Underwood."

The objective of *Mollusca, The Southern Synthesis. Fauna of Australia*, (p. v) is: "to provide authoritative syntheses of primary zoological literature on all taxa to the level of family, for the benefit of a broad non-specialist clientele." Marine, land, and freshwater families are treated equally in their systematic sequence, rather than separated by habitat. This is not a guide at the species level to mollusks of Australia, for which there are other recent efforts. The entire Australian fauna, particularly of smaller shelled forms, is so large that a complete checklist of Australian mollusks has yet to be attempted.

Introductory text of 144 pages gives an overview of the phylum. Chapters relevant to the Australian fauna include a brief history of discovery of Australian mollusks, their occurrence in specialized habitats, economic importance, fossil record, and conservation of Australian mollusks. The sections on techniques in malacology and quantitative sampling have broader

relevance. Remaining text is organized systematically, with treatments of Aplacophora, Polyplacophora, Bivalvia, Scaphopoda and Cephalopoda in Part A, and Gastropoda in Part B. Overviews for the six classes are given and there are diagnoses for the higher category taxa at all levels including superfamily, but the main emphasis is the family level treatments. In some cases the subfamilies, if any, are also treated. An updated classification is provided, as noted in more detail below.

The most recent effort to treat all living mollusks at the family level under one cover is that of K. Boss (1982), whose large chapter, *Mollusca*, in the *Synopsis and Classification of Living Organisms*, was a major summation, although it was limited to about 220 pages, with only generalized illustrations at the class level. *Mollusca: The Southern synthesis. Fauna of Australia* greatly expands and updates that work. Much of the information at the family level is derived from research papers treating the mollusks of other regions. The overviews at the subclass level are thorough and current.

The immensity of the effort and the large number of authors necessarily has made the work somewhat uneven, and the long gestation period of about 15 years has evidently provided problems with keeping the various contributions up to date. For example, the family Pseudolividae has been recognized by a number of recent authors, but it here continues to be treated as a subfamily of Olividae.

Authorship for the chapters and family accounts is not cited directly in the text, which allows for smooth transitions that will please the novice user; however, more experienced users will constantly have to refer to the contents pages to determine authorship of consecutive pages of text. The work could have been more friendly to the specialist user had the general editors decided to add the authorship of each page to the running head.

The recommended way of citing authors of chapters, introductions to chapters, and other separately authored sections in this work are indicated on p. iv, including a reference to all three of the general editors in each citation. A citation in the text could be abbreviated (for example) to: Ponder in Beesley et al. (1998).

Institutional affiliations of living contributors are

listed on p. vii of Part A. Unfortunately, the affiliations of deceased authors are not given and they are indicated as simply "deceased," resulting in a number of omissions that could easily have been remedied by the insertion of an asterisk for the deceased authors.

Separate bibliographies are given for the main introduction and for each of the smaller classes, for each bivalve and cephalopod subclass. For the gastropods, there is an introductory bibliography and one for the prosobranch, opisthobranch, and pulmonate chapters. Having a separate bibliography for each family would have encouraged the reader to browse in the bibliographies, although it would have necessitated some redundancy.

One major criticism of this work (for which the general editors are presumably to blame) is that the names of taxa at all levels do not include the author and date, elements that are part of the name and required for all systematic works in the primary literature. Such omissions include species level and all higher level taxa. Authorship at higher levels is often difficult to determine and requires access to primary sources. In some cases the process can be tedious. Thus, it is regrettable that the job was not done, for the sake of scholarship excellence and taking the opportunity to give the most complete source of such information in one work. Authors and dates might seem superfluous, but for the serious student they are also of general interest in providing clues to the history of taxonomic progress, if only in an abbreviated form. Their omission here hardly can be excused.

Another problem that detracts from its value as a general reference on mollusks is that some families not represented in Australia are not treated. In some cases, the existence of such families is pointed out in the text treating the superfamilies, but in other cases they are simply ignored. For example, the hot-vent associated taxa and the Loxonematacea are not included. Apparently, the general editors deleted portions of the text in which families not occurring in Australia were mentioned (D. Lindberg, pers. comm.). Exactly how many such families are missing would be the subject for a separate paper.

The higher classification adopted for the Gastropoda represents a departure from traditional classifications, even though the treatment of gastropods in three chapters in Part B is structured around the traditional classification of the familiar subclasses Prosobranchia, Opisthobranchia, and Pulmonata, as used by Thiele (1929-1931). Advances and changes in gastropod

classification are discussed in the general account of Gastropoda on p. 566 and again in more detail on p. 606. A revised higher classification to family level and above is presented in Table 15.1 (page 607), based in large part on the most recently published cladistic analysis of Ponder & Lindberg (1997). The new classification is also built upon the work of a number of other recent papers, of which the most influential was that of Haszprunar (1988). In order to avoid the paraphyletic Prosobranchia, the Class Gastropoda is now divided into only two subclasses: Eogastropoda (including the Order Patellogastropoda) and Orthogastropoda, including five superorders: Cocculiniformia, Vetigastropoda, Neritopsina, Caenogastropoda and Heterobranchia. The traditional subclasses Opisthobranchia and Pulmonata are reduced to orders of the Superorder Heterobranchia. The large group Caenogastropoda includes three infraorders: Littorinimorpha, Ptenoglossa and Neogastropoda. Usage of such unfamiliar levels as infraorder serves to reflect the nesting of monophyletic clades. However, it seems to me that Littorinimorpha is a poor choice of a name for a monophyletic group to include families in which shells have siphonal canals.

Basing a higher classification on a cladogram, which represents a phylogenetic hypothesis, is a difficult task. Some recent authors have suggested that ranking be abandoned altogether in classifications. David Lindberg's contribution on the Patellogastropoda was written as an example of a classification for which the cladogram (Figure 15.31) serves as the source for the unranked classification in Table 15.2. However, in a seeming contradiction, the systematic account (pp. 645-652) is presented as ranked with the traditional endings. According to Lindberg (pers. comm.), the formal headings were inserted by the general editors for the sake of consistency. Thus we are unable to evaluate his work as he intended.

I continue to suggest that phylogeneticists deal with the problem of ranking as best they can (by not naming every branch of the tree, for example) and produce ranked classifications that can be visualized and more readily understood. Winston Ponder (who separately authored the diagnoses for all higher level categories of the Gastropoda) and presumably made the decisions about the higher classification, is to be congratulated for the synthesis of gastropod classification represented in this work. It is noted (p. 609) that changes in ranking can be made, as long as the classification reflects relationships.

Future authors of books that include classifications are free to select whatever higher classifications they choose, as the rules of nomenclature and priority do not govern higher classification. The classification presented in *Mollusca, The Southern Synthesis*, is bound to have a major influence in the classifications selected by future authors.

Mollusca, The Southern Synthesis, is an indispensable new reference, both for students and for more experienced users, who will use it for information about groups that are beyond their own specialty. Authors who participate in compilations such as this generally receive far less credit than they deserve, but all who participated in this (myself not included) have contributed to a magnificent work.

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James H. McLean, Los Angeles County
Museum of Natural History, 900 Exposition
Blvd., Los Angeles, CA 90007, USA

THREE STUDENT GRANTS ANNOUNCED

Three university level student grants are announced for the year 1998.

The Western Society of Malacologists (WSM) in conjunction with the Santa Barbara Malacological Society, the San Diego Shell Club and the Northern California Malacozoological Club announce the availability of grants to support student research in malacology to full time students in a formal graduate or undergraduate degree program with research, thesis or dissertation focused primarily on systematics, biology, ecology, physiology, biochemistry or paleontology of marine, terrestrial or freshwater mollusks. The research grants are up to \$1,000. Application deadline is 1 June 1998.

For further information contact Dr. Henry W. Chaney at Ph: 805-682-4711, ext. 334; FAX: 805-963-9679; Email: inverts@sbnature.org

The Curatorial and Research Division of the Delaware Museum of Natural History (DMNH) announces the availability of two natural history graduate student scholarships of \$500 each to students enrolled in a graduate degree-granting program pursuing collections-based research leading to publication. In support of systematic research in Malacology or Ornithology to defray travel expenses incurred in

visiting DMNH to study. Application deadline is 1 May 1998.

For further information contact: Dr. Timothy A. Pearce, (Malacology) Ph: 302-658-9111; FAX: 302-658-2610; Email: tpearce@delmnh.com

The Conchologists of America (COA) announces a program of grants up to \$1500 to support molluscan research by qualified persons undertaking field or laboratory research on Recent or fossil mollusks. Recipients must be citizens or permanent residents of the Americas or to students attending graduate school in the US.

There is no official application form. Applications should not exceed six pages single spaced and should include title, summary of project, proposal, background information, biography and resume, and letter of recommendation from an academic or professional source. For further information contact Dr. Gary Rosenberg at: Ph: 215-299-1033, FAX: 215-299-1170.

The postmark deadline for applications is 15 May 1998. Applications and recommendations must be sent in triplicate to: Dr. Gary Rosenberg, Malacology Department, Academy of Natural Sciences, 1900 Benjamin Franklin Pkwy, Philadelphia, PA 19103-1195, USA. Email: rosenberg@acnatsci.org

NEW DISTRIBUTIONAL INFORMATION FOR *MICRODRILLIA TERSA* WOODRING, 1928 (GASTROPODA: CONIDAE)

CAROL SKOGLUND¹

Associate, Santa Barbara Museum of Natural History,
2559 Puesta del Sol Road, Santa Barbara, California 93105, USA

Microdrillia tersa Woodring, 1928, was described from the Miocene of Jamaica. A single Recent specimen was reported from Bahía Panamá at 22 m depth (McLean *in* Keen, 1971). This specimen, the only one in the Los Angeles County Museum of Natural History, was actually from Isla Secas, Chiriquí Province, Panamá (7°57'45" N., 82°00'45" W). Keen cites the age of Woodring's holotype as Miocene but the Bowden Formation of Jamaica is actually Pliocene (Groves, pers. comm.). A second specimen was collected intertidally at Fort Amador, Canal Zone, Panamá (Shasky, 1997).

A third specimen is here reported (Figure 1). It was dredged by my husband, Paul, and me at Bahía Santiago, Manzanillo, Colima, México in August 1975. The brown shell, 7.5 mm in length, was dredged from 8 to 20 m on a mud bottom. This specimen brings the known distribution of the species north to Colima, México, and also increases the reported size.

My thanks to Lindsey T. Groves of the Los Angeles County Museum of Natural History for checking the museum collection and for the information on the Bowden Formation. I thank David K. Mulliner for the photograph.

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KEEN, A. MYRA

1971. Sea Shells of Tropical West America: Marine Mollusks from Baja California to Peru. Stanford University Press, Stanford, Calif. i-xiv + 1064 pp.; ca. 4000 figs.; 22 color pls.

SHASKY, DONALD R.

1997. New range, depth and size records for some Panamic Province gastropods. *The Festivus* 29(6):45-52, figs. 1-13 (Jun. 12).

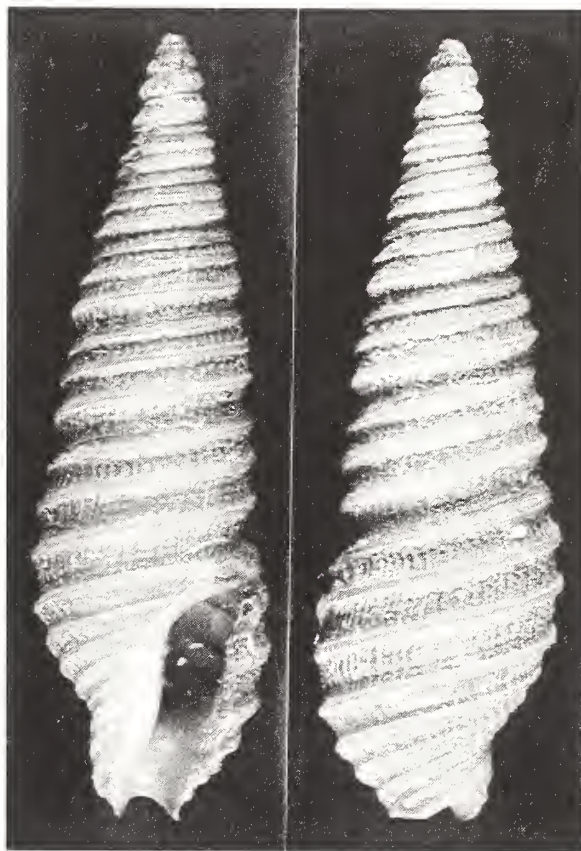


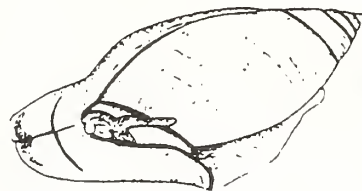
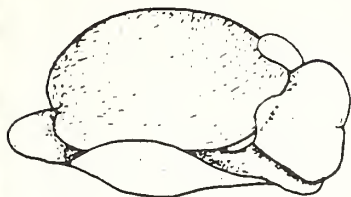
Figure 1. *Microdrillia tersa* Woodring, 1928. Two views of a 7.5 mm specimen dredged from Bahía Santiago, Manzanillo, Colima, México. Leg. P. & C. Skoglund. Skoglund Collection. Photos: D. K. Mulliner.

¹ Mailing address: 3846 E. Highland Ave., Phoenix, AZ 85018, USA.

SAN DIEGO SHELL CLUB

AUCTION/POTLUCK

APRIL 25, 1998



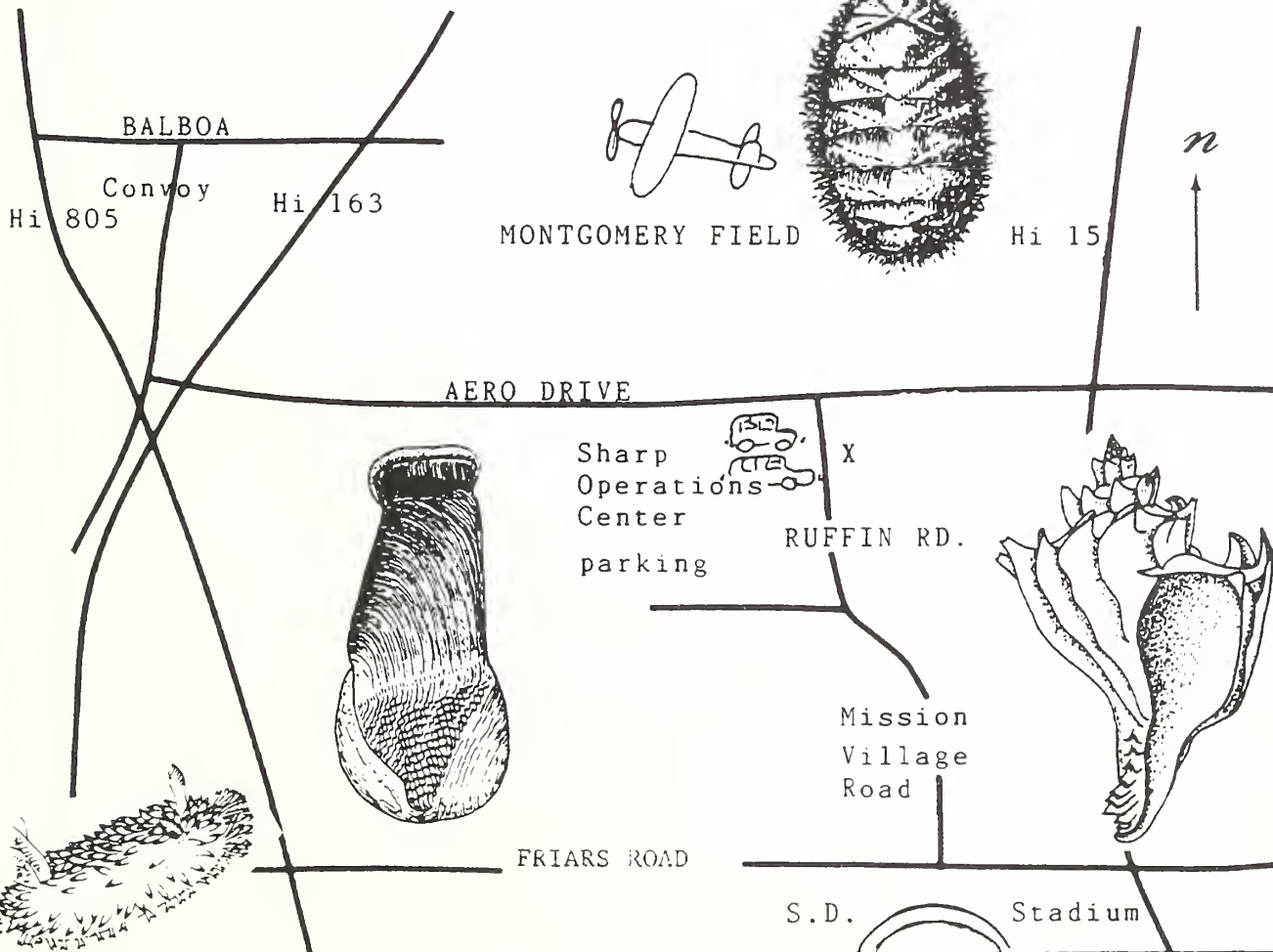
DIRECTIONS TO THE AUCTION: from 805: exit onto Balboa, east to Convoy, south to Aero Dr., east to Ruffin Rd., south about a block or two. Clubhouse on East side of street; park at Sharp Operations Center on West side.

From San Diego Stadium on Friars Road: up Mission Village Drive to Ruffin Rd., right turn or north about a half mile, parking on the west side of the street at Sharp Operations Center across from the Clubhouse.

THE ADDRESS: 3575 Ruffin Rd. at the Summer Hill Clubhouse.

TIME: 5:00 p.m. - ??

REMEMBER TO BRING: Your potluck dish with serving utensils. Also, please bring eating utensils for yourself (plates, cups and napkins will be provided). And come ready to have fun!!



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MOLL



THE FESTIVUS

A publication of the San Diego Shell Club

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Number: 5

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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego



PROGRAM

Fifty Years of Shelling

Ralph Ferguson of Wilmington, California, will give a talk on his many years of shell collecting, his	travels, and his work as a shell dealer. He will also bring a display of his shells.
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Meeting date: 21 May 1998
Shells of the month: Unusual shells

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CLUB NEWS

The Club's Science Fair Winner is Chosen

The Club's judging team of Carole Hertz, Bill Romer and Don Shasky perused the senior entries related to marine life in the 1998 Greater San Diego Science and Engineering Fair. Several projects were notable and received commendation cards from the Club's judges. But the winner was chosen by all three, who agreed that the project by Andrew B. Allshouse, a tenth grader at Serra High School, was outstanding. Andrew, who also won a First Place in Zoology and an award from the Marine Technology Society, won the Club award for his project titled *World of Silence*. This project studied the effects of noise — different types of noise -- on the reproduction of a species of brine shrimp.

Andrew will be invited to give an overview of his project at a meeting of the Club and to receive his Club award, a choice among three books: Morris, Abbott & Haderlie's *Intertidal Invertebrates of California*; Barnes' *Invertebrate Zoology* and Ricketts, Calvin & Hedgpeth's *Between Pacific Tides*.

Changes to the Roster

New members

Clarkson, Peter, PO Box 713, Port Lincoln, South Australia 5606, Australia, ph/fax 001-61-88-682-6926, email: clarkson@camtech.net.au

Drez. Paul E., 8816 Cherry Hills Rd., NE, Albuquerque, NM 87111, (505) 828-9857

Too late for the roster

Hamilton, Ian M., 1702½ Winder St., San Diego, CA 92103, (619) 300-8755

Knapik, Tom, 6952 Tower St., La Mesa, CA 91941-4528, ph. (619) 462-1805

Munekata, Hiroshi, 3385 Kita-toyama Komaki-shi, Aichi-Ken, 485-0023 Japan

Change of address

Velarde, Ron, change email to: rgv@sdcity.sannet.gov

The Club's Annual Auction/Potluck

The Annual Auction/Potluck, held on Saturday evening the 25th of April, was a huge success and a great party. Club members always seem to have a wonderful time when they get together and this time was

certainly no exception. Dave's Punch, as prepared by Bill Romer (with recipe posted), was available when the members arrived. The over 40 members then browsed the wonderful auction material and hastened to sign up for the possibility of acquiring some of the silent auction entries. The food was terrific and in great quantity, and members enjoyed the social time with good friends as they relished the potluck donations.

Promptly at 7 p.m., President Wes Farmer announced the opening of the voice auction. Auctioneer Carole Hertz led the group in some wild and exciting bidding for some outstanding shells, books and coral. One coral piece, larger than the Club punch bowl, drew gasps of appreciation, and exceptional cowries and Galapagan material were some of the entries which resulted in very spirited bidding.

At the break, members checked on their wished-for items in the silent auction and hovered over the \$1 to \$3 table to get some additional bargains. The voice auction continued until the last item on the table was gone and members applauded another auction both fun and successful. The Club thanks Wes Farmer for again hosting the auction venue and all those workers, donors and buyers who made it possible and successful.

Our thanks to the following members and friends who donated to the auction: Terry Arnold, Rick Barilotti, Marge & Hugh Bradner, Twila Bratcher-Critchlow, Billee Brown, Wes Farmer, Carole & Jules Hertz, Linda & Kim Hutsell, John Jackson, Kirstie Kaiser, Kay Klaus, John LaGrange, Mike Mason, Margaret & Dave Mulliner, Rosemary & Frank Pierce, Jeanne & Don Pisor, Chuck Reitz, Dale Roberts, Bill Romer, Nancy & Bill Schneider, Carol Skoglund, Kent Trego, Virginia Upton, Silvana Vollero and Charles Waters.

Booklet of Club's Library Holdings Available

Thanks to the efforts of Librarian Margaret Mulliner and Kim Hutsell, a 17-page booklet listing all the Club's library holdings (books, periodicals/journals and tapes) is now available for members. This project will be greatly appreciated by those members who make use of the Club's fine library and will serve to introduce others to the many excellent books housed in it.

THE PROTOCONCH OF *PHYLLONOTUS EVERSONI*
D'ATTILIO, MYERS & SHASKY, 1987 (MURICIDAE)

BARBARA W. MYERS

Associate, Santa Barbara Museum of Natural History, 2559 Puesta del Sol Road,
Santa Barbara, California 93105, USA

At the time *Phyllonotus eversoni* D'Attilio, Myers & Shasky, 1987, was described (The Nautilus 101(4):162-165, figs. 1 & 2), the protoconch was unknown. Recently, Donald R. Shasky of Oceanside, California, brought three specimens of this species to my attention; one 66 mm specimen (Figure 1) and two juveniles

both having a complete protoconch. All three specimens were collected at Isla del Coco, Costa Rica. We have determined that they are *P. eversoni*.

The two juvenile specimens, the larger one measuring 4.8 x 2.5 mm, was found in 15 to 27 m under coral at Isla Cáscara, 27 February 1988 (Figure 2), and the smaller one measuring 2.5 x 1.5 mm was on coral in 14 to 32 m at Roca Sucia on 7 April 1992 (Figure 3).

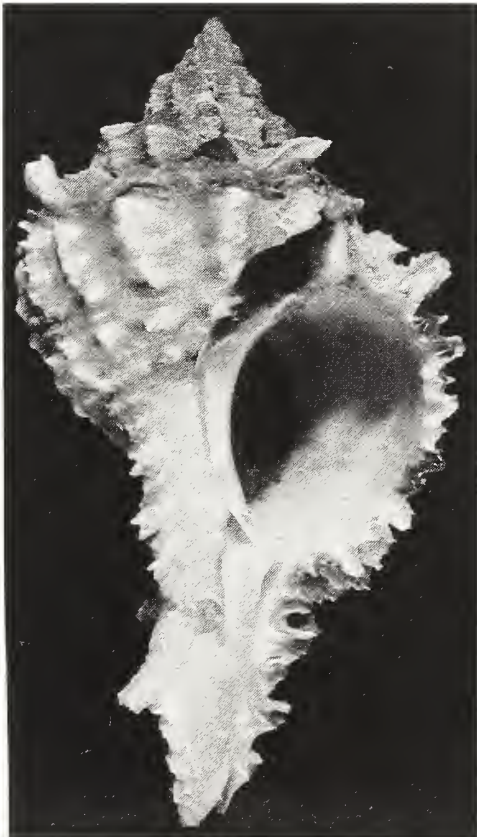


Figure 1. *Phyllonotus eversoni*, apertural view of 66 x 34.5 mm specimen. Taken from tangle net in 90 m off Bahía Chatham, February 1991. Photo: D. K. Mulliner.

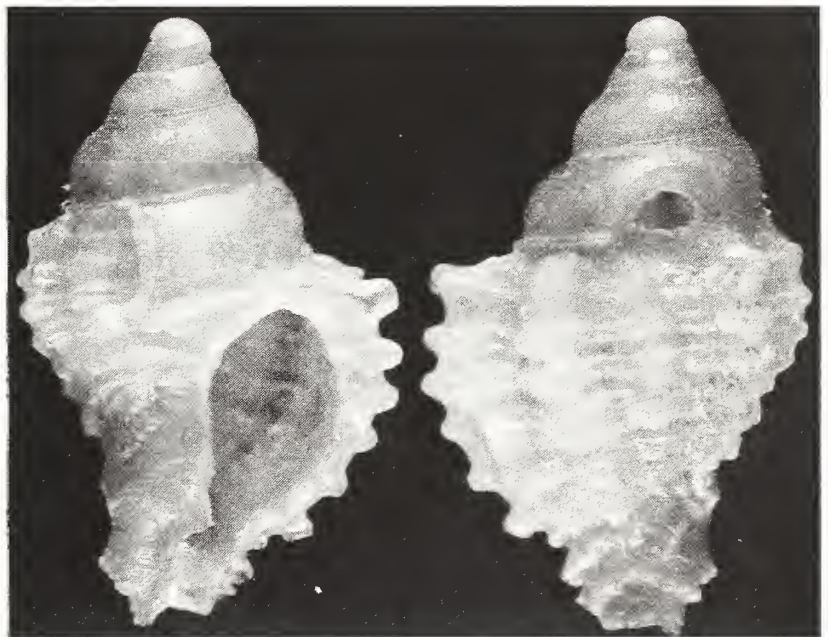


Figure 2. *P. eversoni*. L-r, apertural and dorsal views of 4.8 mm specimen from Isla Cáscara showing protoconch. Photo: D. K. Mulliner.

The protoconchs shown in Figures 2 and 3 have $4\frac{1}{4}$ whorls, the first $1\frac{1}{4}$ are convex, smooth and white, the remaining three whorls are broadly conical, orange-brown in color and under high magnification show scattered pustules, most pronounced on the last

whorl. There is a raised cord at the suture following the first $1\frac{1}{4}$ whorls.

Phyllonotus eversoni has only been found at Isla del Coco, Costa Rica. It attains a maximum length of 189 mm (USNM 859933 [paratype]).

ACKNOWLEDGMENTS

I wish to thank D. R. Shasky for bringing these specimens to my attention and D. K. Mulliner of San Diego, California, for the fine photographs of these small specimens.

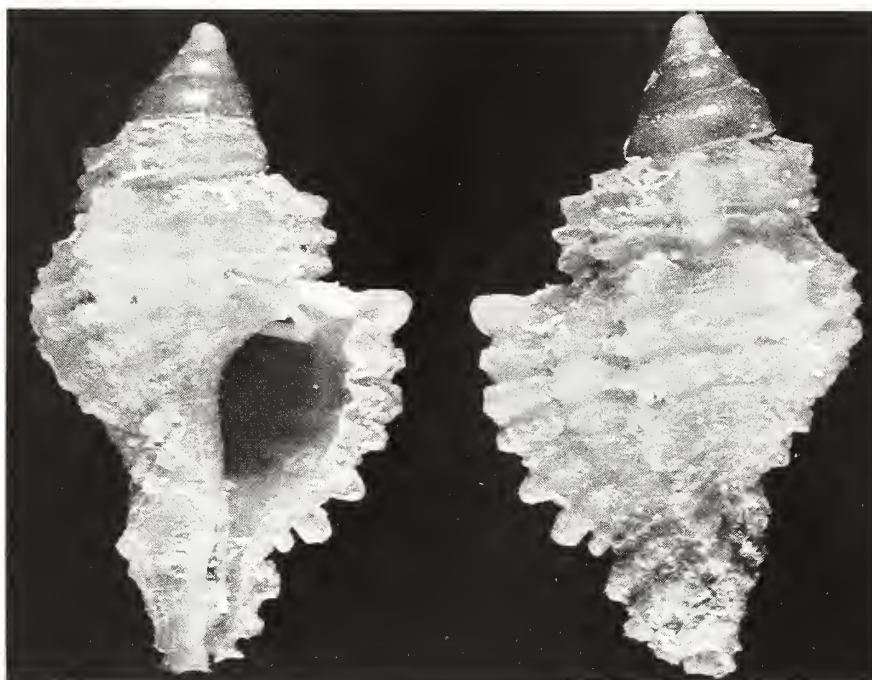


Figure 3. *P. eversoni*. L-r, apertural and dorsal views of 2.5 mm specimen from Roca Sucia showing protoconch. Photos: D. K. Mulliner.

MEETING ANNOUNCEMENTS

World Congress of Malacology - 1998

A reminder for those who have not already made their reservations --The World Congress of Malacology will meet jointly with Unitas Malacologica, The American Malacological Union and the Western Society of Malacologists in Washington D.C. from 25-30 July 1998. For further information contact : Robert Hershler at the Smithsonian Institution; email: hershler.robert@nmnh.si.edu or WSM president Sandra Millen at Dept of Zoology, U.B.C., 6270 University Blvd., Vancouver, B.C., Canada V6T 1Z4 or email: millen@zoology.ubc.ca or Fax: (604) 822-2416.

Conchologists of America - COA '98

The COA will hold its 27th annual convention in

Orlando, Florida from 19-23 July, 1998 at the Hotel Royal Plaza hosted by the Central Florida Shell Club. There will be a welcome party, programs, bourse, auction, banquet and field trips. For further information contact: Chairperson Linda Koestel, 407-880-1176 or Registration Chairperson Phyllis Gray, 407-422-0253.

Seventh International Shell Show in Belgium - 1998

The Belgian Society for Conchology announces its shell show on the 3rd and 4th of May 1998 with exhibitors and visitors from all continents. For further information contact Secretary R. De Roover, Vorsterslaan 7, 2180 Ekeren-Donk, Belgium; Tel/Fax: 00-32-3-644-34-29.

THE RADULA OF *CYPRAEOVULA CASTANEA*

HUGH BRADNER

Scripps Institution of Oceanography, La Jolla, California 92093, USA

E. ALISON KAY

Department of Zoology, University of Hawaii at Manoa, Honolulu, Hawaii 96822, USA

The radulae of two specimens of *Cypraeovula castanea* (Higgins, 1868) (= *Cypraea verhoefi* Burgess, 1982)¹ have been prepared and photographed as described by Bradner & Kay (1995, 1996). The specimens were collected by Bruno de Bruin at SCUBA depths near Port Elizabeth, South Africa. The *C. castanea* radular teeth are similar to those of *C. iutsui* and *Nesiocypraea teramachii* in the achatidea pattern of Bradner & Kay, 1996, figs. 109, 111, approximating the length, number of radular rows and width of the radula. As in *C. iutsui* and *N. teramachii* the central tooth is tricuspid and nearly rectangular, about 30% wider at the base than at the apex. It is more than 220 microns in length (the longest in the *Cypraeovula*), and longer than it is wide (l/w ratio 1.33), with a pair of prominent longitudinal ridges mid-shaft, and small denticles at the base. Other similarities include laterals that are about 50% longer than the central, and outer marginals that are about 10% shorter than the laterals. The small basal denticles of the central tooth point toward the laterals, while the laterals have a prominent denticle oriented toward the central tooth.

Figures 1A, 1B, and 1C are scanning electron microscope photos of specimen no. 1: (A) directly

above the specimen (stage at 0°), (B) looking along the ribbon with the stage tilted at 60°, (C) stage at the same tilt angle of 60° but rotated 45° to view the ribbon obliquely. Scale bars (150 micron) are shown on Figures 1A and 1B. Figure 2 shows a central tooth of specimen no. 1 at higher magnification. Figure 1D is an optical microscope photo of specimen no. 2 lightly stained with acid fuchsin and mounted in Caedax ($\eta = 1.56$). SEM and optical examination of the two radulae showed essentially identical teeth.

Shell and radular data: Length of shell: 36.5 mm (specimen no. 1), 39.5 mm (specimen no. 2). Length of radula: 12 mm (specimen no. 1), 20 mm (specimen no. 2). Number of radular rows: 60 (specimen no. 1), 91 (specimen no. 2). Number of radular rows per mm radula: 5.0 (specimen no. 1), 4.6 (specimen no. 2). Width of radular ribbon: 800 microns (specimen no. 1), 700 microns (specimen no. 2). Central tooth dimensions: 227 x 170 microns (specimen no. 1), 220 x 170 microns (specimen no. 2).

Very few living specimens of *Cypraeovula castanea* have been collected at SCUBA depths, and only along the limited southern region of South Africa. Lorenz & Hubert (1993) note that severely eroded shells are commonly washed ashore; Liltved (1989) comments that the species possesses a particularly thin glossy dorsal layer, and therefore extremely few beach shells with intact dorsal enamel and coloration have been found.

ACKNOWLEDGMENTS

We are indebted to Bruno de Bruin for the animal specimens, the collection data and the shell measurements. The SEM photos were partially funded by a grant from the Director of the Scripps Institution of Oceanography.

¹The species was originally described as *Luponia castanea* Higgins, 1868. The long and convoluted history leading to the names *Cypraeovula castanea* and *Cypraea verhoefi* is described in treatises such as Burgess (1985, p.32), Liltved (1989, p.41) and Lorenz & Hubert (1993, p.25). In brief, by Article 59 (d) (I) of the International Code of Zoological Nomenclature, Third Edition, February 1985 the name *castanea* can be assigned to another genus in which its species name is not preoccupied. Thus the name *castanea* is valid when the taxon is assigned to the genus *Cypraeovula*. However in attempting to place all cowries in the single genus *Cypraea* Burgess found that *castanea* was preoccupied by a different cowrie, *Cypraea castanea* Röding 1798, and therefore the ICZN rules required a renaming. Burgess chose to name it *verhoefi*.

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BURGESS, CLARENCE M.

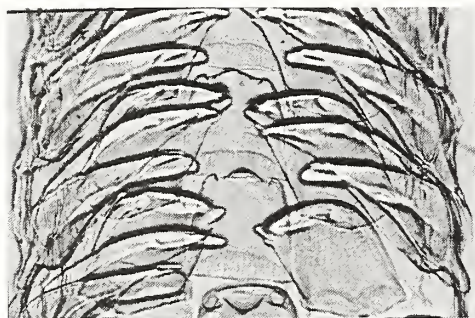
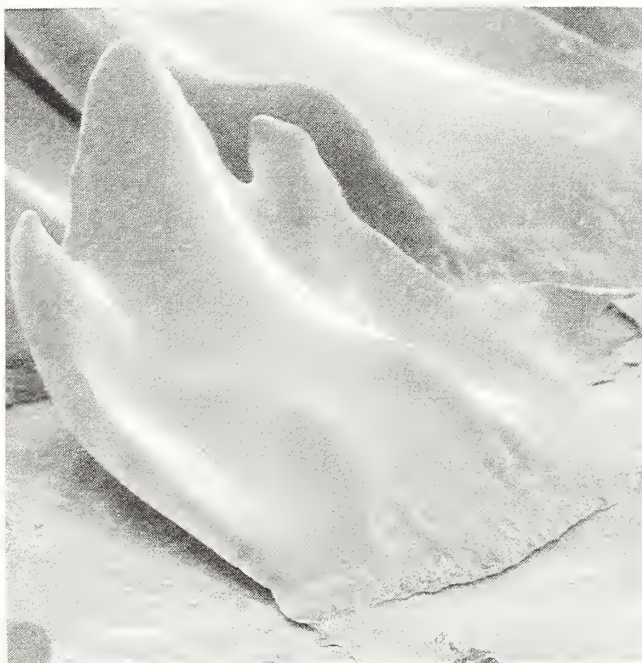
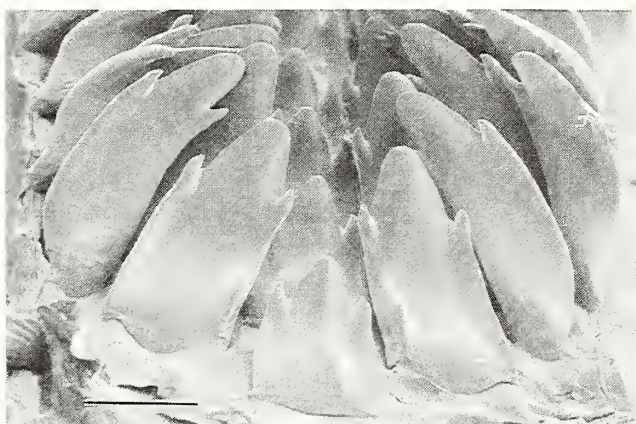
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Town, South Africa: 289 pp., 20 pls., numerous figs.

LILTVED, WILLIAM R.

1989. *Cowries and Their Relatives of Southern Africa*. Seacomber Publications, Cape Town, South Africa: 208 pp., 298 figs + numerous unnumbered figures.

LORENZ, FELIX JR. & ALEX HUBERT

1993. *A Guide to Worldwide Cowries*. Verlag Christa Hemmen, Wiesbaden, Germany: 571 pp., numerous figs., 124 pls.

Figures 1 A-D, 2. *Cypraeovula castanea* (Higgins, 1868). (A) Segment of radular ribbon, specimen no. 1, viewed from directly above ribbon (scanning electron microscope stage at 0°). Scale bar shows 150 microns length. (B) Segment of radular ribbon, specimen no. 1, viewed along the ribbon with the scanning electron microscope stage tilted at 60°. Scale bar shows 150 microns length. (C) Segment of radular ribbon, specimen no. 1, viewed with the scanning electron microscope stage tilted at 60° and rotated 45°. (D) Segment of radular ribbon, specimen no.2, photographed with an optical microscope. (2) Scanning electron microscope photograph of central tooth of specimen no. 1.

NEW DISTRIBUTIONAL INFORMATION FOR A RARE PANAMIC *PETRICOLA*

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Shortly after my revision of eastern Pacific Ocean *Petricola* appeared (Coan, 1996, 1997), William Ritter, of Astoria, Oregon, called to my attention the availability of material identified as *Petricola concinna* G. B. Sowerby I, from Nicaragua.

I obtained samples of this material both from Ritter and from Robert A. Foster of Santa Barbara, California, and it proved to be correctly identified.

The material was collected by Emelio Gracia of Lafayette, Louisiana, at Puerto Masachapa [Montelimar], Carazo Province, Nicaragua (11.8°N), burrowing into hard, gray clay. Several specimens were obtained, of which three are illustrated here (Figure 1) and have been placed in the Santa Barbara

Museum of Natural History (SBMNH 144482). This constitutes a new northern distributional record by approximately 800 miles; the most northerly material previously seen was from Esmeraldas, Esmeraldas Province, Ecuador (1°N). This Nicaraguan material is only the ninth known station for this uncommon bivalve.

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- 1996. Recent species of the genus *Petricola* in the eastern Pacific [Bivalvia: Veneroidea]. *The Festivus* 28(11): 118-124, figs. 1-24. (14 Nov.)
- 1997. Recent species of the genus *Petricola* in the eastern Pacific (Bivalvia: Veneroidea). *The Veliger* 40(4): 298-340, figs. 1-70. (1 Oct.)



Figure 1. *Petricola* (*Petricolirus*) *concinna* G. B. Sowerby, I, 1834. Puerto Masachapa, Carazo Province, Nicaragua.

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THE FESTIVUS

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Meeting date: third Thursday, 7:30 PM,
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PROGRAM

Diving and Collecting the Brittany Coast and Corsica

Richard Herrmann, Club member and award-winning photographer, will give a slide presentation on

and

Andrew B. Allshouse, a 10th grader at Serra High School and the Club's Science Fair winner, will

his travels to Brittany and Corsica with Ron McPeak and share with us his many adventures.

give an overview of his winning project, "World of Silence" and receive the Club's book award.

Meeting date: 18 June 1998
Shells of the month: European shells

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting - May 21, 1998

President Wes Farmer called the meeting to order and welcomed visitors to the meeting. About 30 people were in attendance. The minutes of the March meeting were accepted and Don Shasky announced that the June speaker would be Richard Herrmann.

The winner of the shell drawing was Rick Barilotti and a thank you was given to the Bradners for reprinting the numbers on the drawing shells for us. Don Pisor announced that the La Jolla Cave and Shell Shop will be closing its doors permanently on Labor Day. Rick announced that he is looking for a good used copy of Keen's 1971 edition of *Sea Shells of Tropical West America*.

Don Shasky introduced the speaker for the evening, Ralph Ferguson. Ralph told wonderful tales of his boyhood days as a young collector in northern California. He found his first shell, an oyster shell, in Eureka. He brought several items from his collection for members to view among which were several freaks. He told how so many of the shells and marine life that were plentiful when he was a boy are no longer found along the coast. For example, he's no longer readily finding sea stars along the California coast.

Refreshments for the evening were contributed by John Bishop and Wes Farmer. The meeting was adjourned at 8:30 p.m. with a motion by Billee Brown. Everyone enjoyed the refreshments, socializing and admiring the shells brought in by Ralph and Don Pisor.
Silvana Vollero

A New Book is Added to the Club Library

The new book by Kurt Kreipl entitled *Recent Cassidae* has been purchased by the Club. This 151 page book with 24 color plates and numerous line drawings by Dora Jäggle treats the family Cassidae worldwide. A brief description of each species, its range, type locality and repository of the type, where known, is given in the text and each species is shown in color in at least two views.

The book will be available for circulation at the June meeting.

Changes to the Roster

New members

Olsen, Lee F., P.O. Box 99941, San Diego, CA 92169, (619) 274-3392

Perrone, Antonio, via Palermo 7, 73014 Gallipoli, Italy

Too late for the roster

Auckland Institute & Museum, Serials Librarian, Private Bag, 92018, Auckland, New Zealand

Clark, Roger N., 1839 Arthur St., Klamath Falls, OR 97603, (541) 883-7582, email: insignis@cidsnet.net

Changes of address

Foster, Robert, 365 Foothill Road, Bishop, CA 93514

Drez, Paul, add email: drez@nmia.com

Of Sea and Shore Publications Announces New Edition of Dealers' Price Catalog

The 16th edition [for 1998] of *A Catalog of Dealers' Prices for Shells: Marine, Land & Freshwater*, commonly called "Rice's Prices" is now available at \$19.50 plus postage. It is announced to be 230 pages, spiral bound and arranged alphabetically by genera giving prices for each species with more than 29,700 entries and expanded sections on cowries, murex and volutes. To obtain an order form, contact Tom Rice at P.O. Box 219, Port Gamble, WA 98364 or email: ofseashr@pacific.telebyte.com or Ph/Fax 360-297-2426.

A "Thank You" to Don Pisor

The Club is grateful to Don Pisor who continues to store Club auction material in his warehouse between the Club's annual auctions. It is much appreciated.

A Date for the September Party

Terry and Marty Arnold will once again host the September party at their home. It will be held on Saturday evening September 19th. Mark your calendars for this always enjoyable affair. Details later.

THE BIVALVE *SEMELE RUBROPICTA* LIES ON ITS SIDE

ROLAND C. ANDERSON

The Seattle Aquarium, 1483 Alaskan Way, Seattle, Washington 98101, USA

The bivalve *Semele rubropicta* Dall, 1871, is relatively well known from its shells. A member of the family Semelidae, getting 50 mm long, it is easily distinguished from other shelled bivalves by red streaks on the exterior of its shells and its deep pallial sinus (Quayle, 1970; Kozloff, 1987; Coan, 1988; Foster, 1991). Aside from aspects of its shell, substrate preference, water depth and distribution, little is known of its natural history or biology. Although its "official" common name is the "rose-painted semele" (Turgeon, et al., 1988), it is also called the "sunset clam" in the Pacific Northwest, although that name is also used for *Gari californica* (Conrad, 1837) another clam with a red-streaked shell.

I first became interested in *S. rubropicta* in 1986 while researching Kennerley's venus clam, *Humiliaria kennerleyi* (Reeve, 1863) (Anderson, 1987). The two are sympatric subtidally in parts of Puget Sound (Washington State). Digging *H. kennerleyi* by scuba diving and fanning the sand and gravel with my hands, I encountered many *S. rubropicta*, buried 5-10 cm deep in the gravel, in water 15-20 m deep on the north side of Three Tree Point. I collected some of these *S. rubropicta* for the Santa Barbara Natural History Museum in 1987. At that time, I had the impression that the *S. rubropicta* were lying on their sides within the substrate, much as does *Macoma nasuta* (Conrad, 1837) (Ricketts et al., 1968; Quayle, 1970). A further, more careful excavation of *S. rubropicta* was indicated.

A scuba dive was performed on 13 March 1997 to study *S. rubropicta*. As can be seen in Figure 1, *S. rubropicta* does indeed lie on its side in the substrate. As they were carefully uncovered, an "X" was marked on the upper shell. The clams were retrieved and taken to the Seattle Aquarium for examination. Those uncovered and marked (N = 9) were all lying on their left sides.

It is not known what advantage the clam may achieve by this posture. Other bivalves that lie on one side generally have unequal shells (e.g. oysters or jingle

shells). The bent-nose clam *Macoma nasuta* lies on its left side and directs its two separate siphons upward through its distorted valves (Ricketts et al., 1968). Members of the genus *Semele* also have two long, separate siphons (Boss, 1972), and while the shells of *S. rubropicta* are equal, many other species of *Semele* have unequal valves (Boss, 1972; Coan, 1988). Two other species [*S. proficua* (Pulteney, 1799) and *S. purpurascens* (Gmelin, 1791)] have been reported to bury on their left sides (Boss, 1972; Domaneschi, 1995). Domaneschi (1995) postulated that the suspension-feeding *S. proficua* and *S. purpurascens* were an evolutionary link to the deposit-feeding Tellinacea. Further research is indicated on this interesting family of bivalves to determine what advantage may be achieved from lying on a side.

Knowledge of the natural history and ecology of many bivalves from the Northeastern Pacific is scarce or unknown for the less-common species. The description of natural history events and experiments can show the ecological significance of bivalves in many shallow-water communities (Paine, 1974). Mollusks may play an important role in the bioturbation of bottom sediments (Quayle & Bourne, 1972; Boletzky, 1996). When disturbances occur to the substrate, such as from commercial clam digging activities or the capping of polluted sediments in harbors, it becomes more important to learn the ecological role each species plays, and natural history observations such as this contribute to the overall knowledge of the ecology of an area.

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Figure 1. A live *Semele rubropicta* that has been carefully uncovered shows it lying on its left side. The shorter rounded end of the shell is posterior. The large buried clam is a *Humularia kennerleyi*. Photo by Jeff Christiansen.

ARENE SOCORROENSIS (STRONG, 1934)
WITH NESTLING NEPIONIC LARVAE

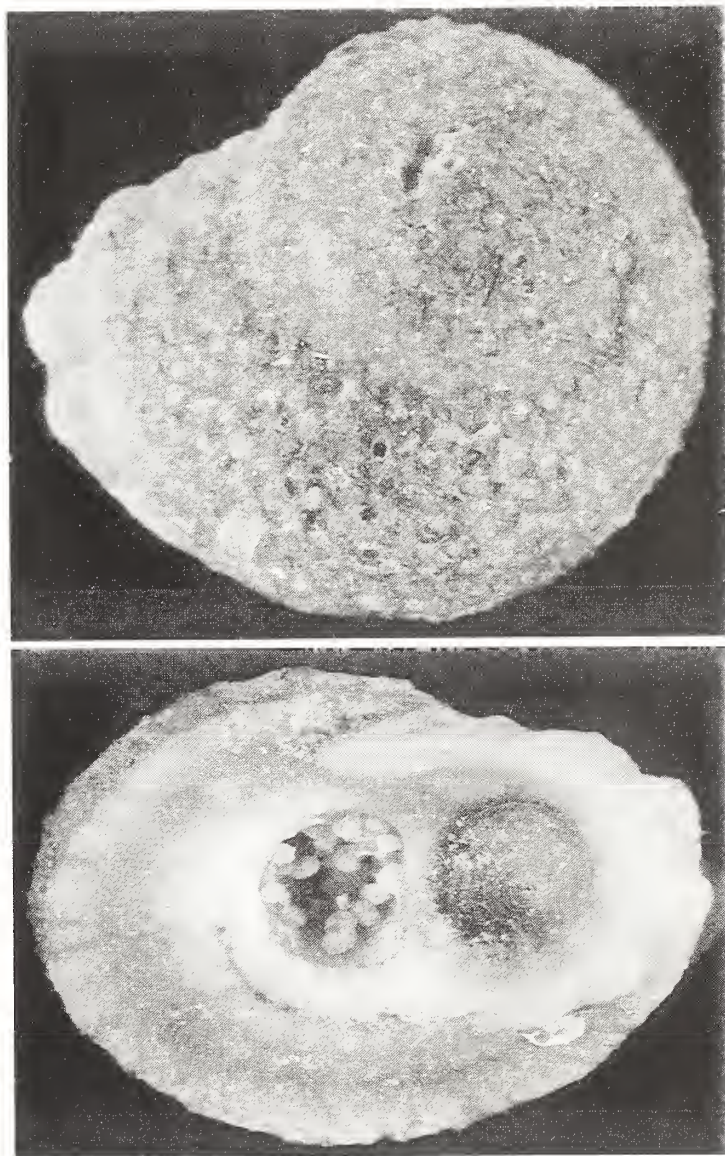
CAROLE M. HERTZ

Associate, Santa Barbara Museum of Natural History,
2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, USA

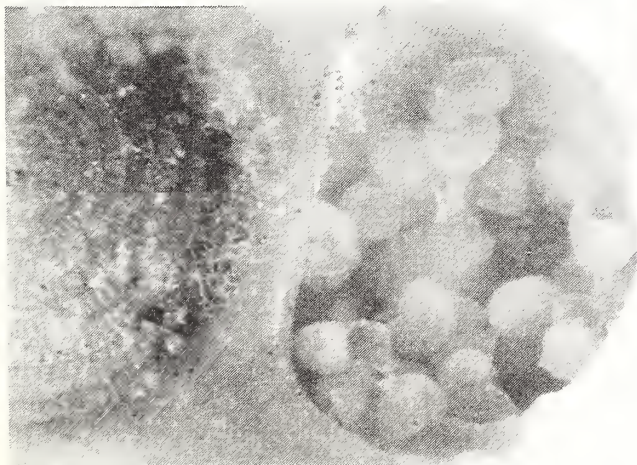
In 1967, Dr. Donald R. Shasky published his discovery that the species *Arene socorroensis* (Strong, 1934) “nestled their nepionic offspring within the umbilicus.” He noted that “ten or more of the juveniles are frequently seen within the umbilicus of the parent” [Observations on *Rosenia nidorum* (Pilsbry) and *Arene socorroensis* (Strong). *Annual Report of the American Malacological Union* 34:74 (abstract)].

In a visit to Kirstie L. Kaiser in February 1997, Kirstie showed me specimens of *Arene socorroensis*, collected living, with the nepionic larvae in the umbilicus and I borrowed the specimens from her to have one photographed (Figures 1-3) since they had never before been figured. In Figures 2 and 3 at least twenty nepionic larvae can be seen in the umbilicus of the photographed female specimen. Shells of females have a broader umbilical cavity than those of males (McLean, pers. comm.). The specimen, in the K. L. Kaiser collection, was collected by her, in 12-15 m (40-50 ft) under rocks at Cabo Middleton, Isla Socorro, Islas Revillagigedo, México, on 29 November 1988.

My thanks to David K. Mulliner for the wonderful photographs, to James H. McLean for information on *Arene* and to Kirstie L. Kaiser for making the specimens available to me.



Figures 1-3. *Arene socorroensis* (Strong, 1934). Three views of a specimen, 4.8 mm maximum diameter. (1) spire view, (2) apertural view showing nepionic larvae in the umbilicus and (3) closeup view of aperture. Photos: D. K. Mulliner.



EXPLORING LAS BAHÍAS DE HUATULCO

MICHAEL SMALL

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Las Bahías de Huatulco are a series of nine small bays along a rocky wooded shoreline on the southern coast of the Mexican state of Oaxaca (Figure 1). It is a sparsely populated and formerly very isolated region, cut off from the central valley of Oaxaca by the high

My interest in diving in Huatulco began on the trip home from the Clipperton '94 Expedition, when Dr. Peter Glyn of the University of Miami mentioned to me that he had always wanted to survey the coral reefs that reportedly existed there. It took us almost two years to

coordinate our plans; however, by the last week of February 1996, Peter and I arranged to meet in Mexico City and proceed to Oaxaca. Charlie Waters, another veteran of the Clipperton trip, flew in from Los Angeles and the three of us spent the week exploring the region.

We checked into a very comfortable and inexpensive Mexican-French run hotel, the Hotel Marlin in Bahía Santa Cruz (Figure 2). The hotel had

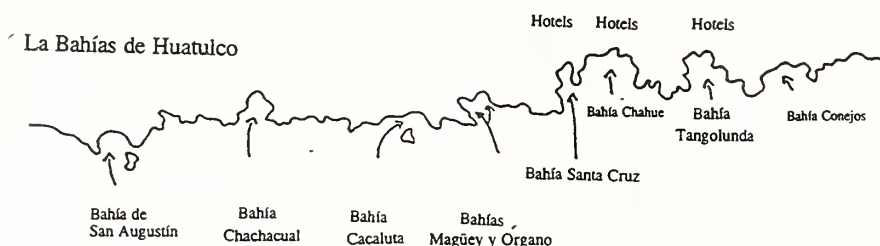


Figure 1. Map of Bahías de Huatulco showing the nine small bays. Map is not to scale.

mountains of the Sierra Madre Occidental. In the early 1970s, the nearby town of Puerto Angel became a famous destination for North Americans seeking magic mushrooms and large waves to surf. In the 1980s, Huatulco was selected by former President Lopez Portillo (reportedly after passing by on his yacht) as the site of the next Cancun. Fortunately, the tourist boom has never really taken off. A number of medium-sized hotels have been built on the largest bay and a good modern airport exists with regular flights. But the urban sprawl of Cancun or Acapulco has been avoided, and more recently the Mexican Ministry of Natural Resources has succeeded in protecting the entire coastline on either side of the three principal tourist bays. It is a quiet area, with comfortable hotels to stay, inexpensive boats to rent and beautiful vistas of the blue-green mountains rising up behind the rocky shoreline.

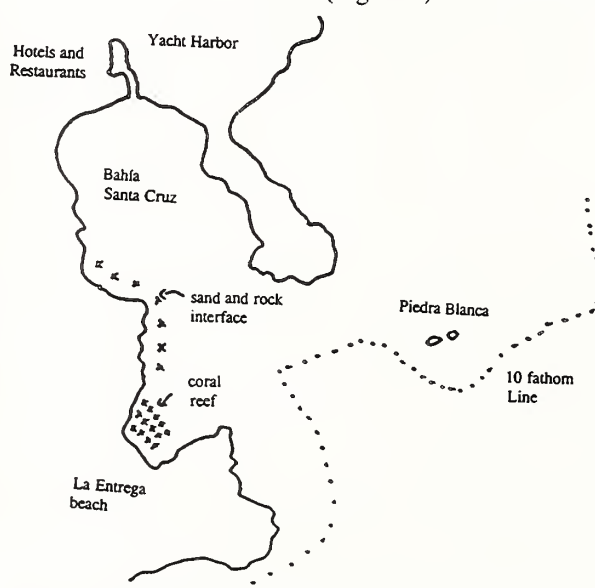


Figure 2. Map of Bahía Santa Cruz. Map is not to scale.

the advantage of having the only dive shop in Huatulco attached to it, where we were able to rent tanks and weights. From there it was a short stroll down to the yacht harbor, where we were able to charter for the week a large covered panga to take us up and down the coast. On dive trips, I generally prefer to bunk into live-aboard boats; but I must admit, there are advantages to staying in a spacious air conditioned bedroom of one's own for \$30 a night, with a private balcony to stash one's shells and a French-run creperie for those post-dive hunger pains.

Our first surprise came when we hit the water on our first dive. Huatulco is far south by Mexican standards, and even in February the climate was tropical. Nevertheless, the water temperature was a chilly 66°F. Strong offshore winds (for which the nearby Bahía de Tehuantepec is famous) had produced cool upwellings and a plankton bloom lowered the water visibility to about 9 m (30 ft). The temperature gradually rose to the mid 70s during the week we were there, but, nevertheless, I dove with a heavy wetsuit top and a hood the whole time.

Our next surprise was the volume of coral in the bays. Virtually every protected spot was covered in dense beds of green *Pocillopora* coral from about 3 to 9 m (10-30 ft). In one spot on the eastern side of Bahía Tangolunda (where the main hotels are located) we found a couple of *Pavona* coral heads. Otherwise, all of the coral was the same *Pocillopora* species. Peter was struck as much by the low biodiversity as he was by the quantity of the coral. Much of it, however, was dead. By questioning local inhabitants, Peter concluded that the die-off had largely occurred during the 1983 El Niño. However, run-off from on-land development in the main bays has also probably played a role.

Overall, the terrain in the nine bays was very similar. None of them is deeper than 14 m (45 ft). The average bay has smooth boulders mixed with stones and rubble along the sides, bottoming out to flat sand around 9 m (30 ft). The coral covers the flat protected areas. The bottoms are all covered in fairly coarse white sand, often in dunes. We sampled dive spots along all nine bays, but as it turned out, we spent the greatest amount of time diving in the narrow sheltered bay, Bahía Santa Cruz, directly in front of our hotel. This was partly because it contained a very well developed coral reef in front of the popular tourist beach of La Entrega, which Peter decided to survey in some detail during our day dives. For our night dives, Charlie and I decided that since the bottom in all the

bays was fairly similar, we might as well concentrate on the closest bay at hand.

During the day we mostly turned rocks from 3-9 m (10-30 ft). The fauna was comparable to other places which I have dived along the central Mexican coast, such as Ixtapa and Bahía de Banderas. Typical species commonly found were *Calliostoma aequisculptum*, *Cypraea arabicula*, *Cymatium gibbosum*, *Bursa corrugata*, *Columbella major*, *Morum tuberculosum*, *Conus purpurascens* and *C. brunneus*. Dead calyptraeids were particularly numerous under stones - I collected at least six different species. Among the rock-dwelling gastropods, I was pleased to find the smallest Panamic *Columbella*, *C. sonsonatensis*. I also found six of the delicate *Tripterotyphis fayae* (Figure 3).



Figure 3. *Tripterotyphis fayae* (Keen & Campbell, 1964), two specimens found at Bahía de San Agustín, February 1996.

Their habitat is very specific: clinging to the surface of a flat rock face, covered in algae and fine silt, usually resting against another rock. Once you spot one, it is worth looking carefully for more. I found four on one stone after looking for several minutes.

Night diving on the open sand did not prove particularly productive. The most interesting species we found in this terrain was a single, black-stained, mature *Strombus peruvianus*, found by Charlie in the middle of Bahía Santa Cruz. We found the most productive night diving to be along the edge of the interface between the sandy bottom and the rocky slopes. Charlie and I found two very large, mature *Cypraeacassis coarctata* hunting at night in this environment - one specimen measuring 73 mm and the other 84 mm. Fine *Hexaplex regius* were also plentiful, usually on the sand just under overhanging rocks. This zone also proved to be very

rich in colorful bivalves. Under stones *Cardita grayi* and *C. crassicostata* were found, while on the nearby sand at night we found *Cardita megastropa*, *Trachycardium consors* and *T. pristipleura*. The western side of Bahía Santa Cruz and the sides of nearby Bahía Maguey both proved to be rich collecting areas along the sand/rock interface.

For me, the high point of the trip came on a Wednesday afternoon in Bahía Santa Cruz. Peter Glyn was carrying out transects over the shallow water coral in La Entrega. Since this was a mollusk-poor zone, I decided to swim along the boulders down by the sand heading back towards the yacht harbor. In 25 feet of water, I noticed a large shell with a strange tufted periostracum clinging tightly to a smooth rock face. In this behavior, it looked exactly like the *Cymatium*

parthenopeum keenae which I had found the year before in Bahía de los Angeles, Baja California, but the shape and periostracum were completely different. When I removed it from the rock, I discovered that it had a brightly colored yellow and black mouth. I realized that this was a shell which I had never seen alive before, and which no one I knew had ever collected: a *Cymatium tigrinum* (Figure 4). As I returned to the boat, I mentioned as nonchalantly as I could to the couple of other divers aboard that I had just found the rarest shell of my collecting career.

When we returned to the hotel, Peter, Charlie and I tried to photograph the live shell in order to record the spectacular animal. Unfortunately, we did not have the right kind of close-up lens to be able to take a sharp enough picture. Nevertheless, I can report that a live

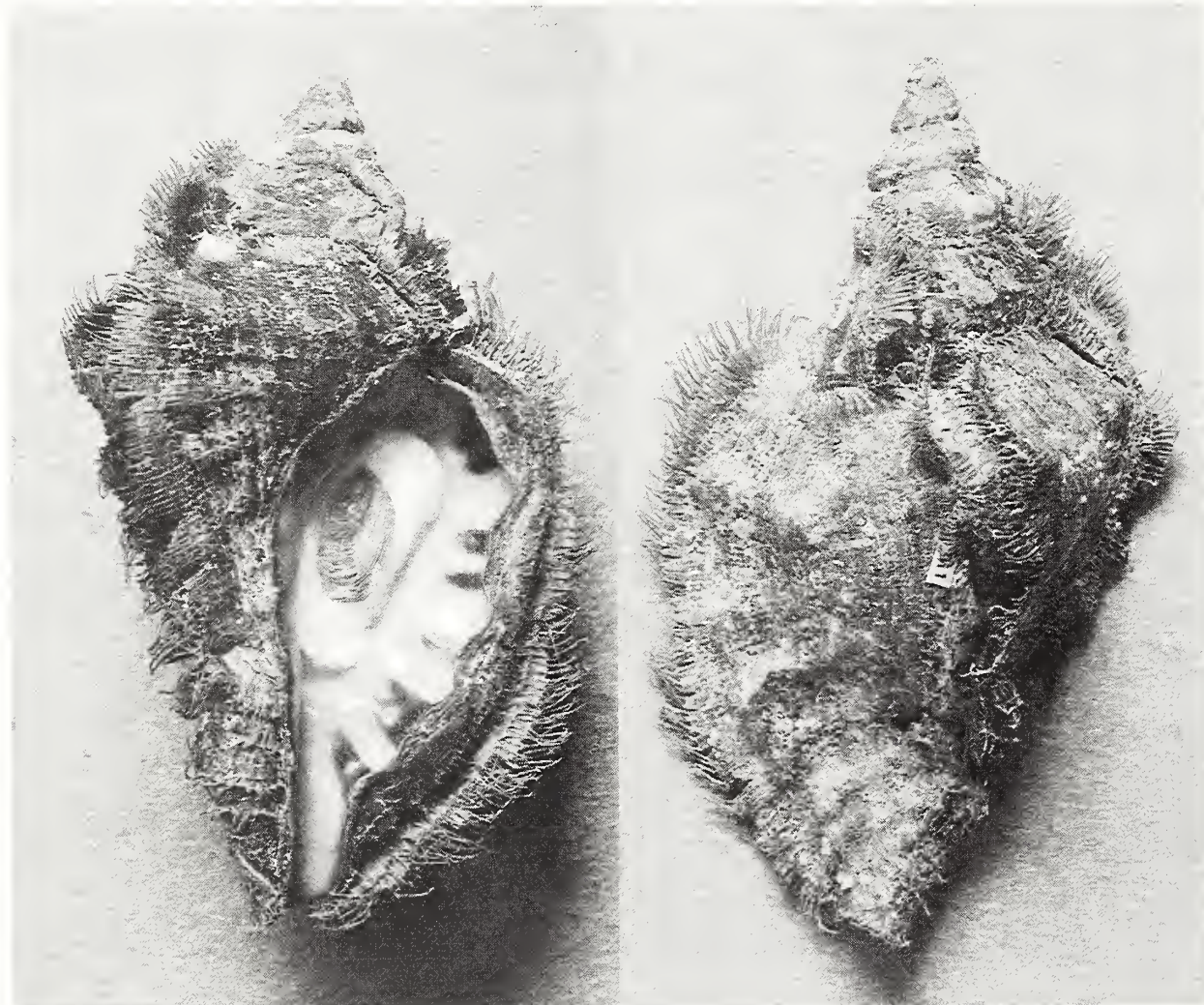


Figure 4. *Cymatium tigrinum* Broderip, 1833, two views of a 129.5 mm specimen found at Bahía Santa Cruz, May 1996.

Cymatium tigrinum has a brick-red animal with small black spots shaped in perfect ovals, ringed with a fine line of yellow. Equally interesting is the periostracum, which is smooth on the sides of the shell, but which sweeps up to produce a double row of long tufted hairs along each of the three varices. When I showed it to Enrique Laclette, the owner of the local dive shop, he told me that it was common enough in the area that the fishermen have given it a Spanish name *patillas* or "sideburns" shell which is an apt description of its periostracum.

For a break one morning, we decided to visit the Universidad del Mar in Puerto Angel where Peter Glyn had made some contacts. The University is, in fact, a small college recently established by the state government to promote development along the coast of Oaxaca. Its two main faculties reflect the economy of the area - tourism and marine science. While Peter talked to the coral expert, Charlie and I spent time with the three researchers who were starting work putting together a malacology checklist for the area. We were surprised to discover that after five days of diving, we already had seen more mollusk species than they had after eight months of work. Partly, this was due to the fact that they did not have ready access to scuba equipment and boats (although they knew how to dive). Moreover, it was due to their decision to do intensive research habitat by habitat, and they had started with the coral reefs of the area, which, in fact, are very poor in mollusks. Although they had copies of Keen's (1971) *Sea Shells of Tropical West America* and a good scientific grounding, I was struck by how restricted they were by the lack of a reference collection and the lack of recent malacological literature e.g. a subscription to *The Festivus* and the 1992 supplements to Keen compiled by Carol Skoglund. They were keen to make contact with American experts in Panamic malacology and I subsequently sent them a number of addresses. If any readers of *The Festivus* are in the area, I would encourage them to make contact with the University. It is well situated on a hilltop just outside Puerto Angel. Furthermore, it has an attractive guest house where distinguished visitors can be comfortably accommodated.

For our final day in the area, Charlie and I decided to hire a taxi and travel east along the open coast of the Bahía de Tehuantepec. Our first stop was a wide open beach along a shallow bight called Ensenada Chipewa. Here we spoke to some local fishermen who readily sold

us several *Hexaplex brassica* and *H. ambiguus* that they had caught in their nets around a rocky outcrop just offshore. Beyond Ensenada Chipewa lies the Isthmus of Tehuantepec - the waist of México. This region is famous for its climate: it is low, flat, very hot and prone to high winds that blow across the Isthmus from the Gulf of México on the Atlantic side to the Bahía de Tehuantepec on the Pacific side. It is also famous for its powerful women - celebrated in art by Diego Rivera and Miguel Covarrubias - who continue to dress in traditional flowered blouses and heavy gold jewelry and who carry themselves with an air of authority, reflecting their role as the head of their households. We glimpsed several such "tehuanas" walking barefoot, majestically along the sidewalk in the main town of Salina Cruz.

Salina Cruz, itself, is a hell-hole. Its economy revolves around the oil refineries, where the petroleum piped in from the Gulf of México is processed and then shipped north to the United States. There is not a tree in sight around the heavily eroded hillsides; people live in cinder-block homes, and the daily temperature is over 100°F. It is also the base for a large shrimp trawling fleet that operates in the shallow waters of the Bahía de Tehuantepec. Charlie and I headed directly to the docks and started wandering around looking for shrimpers which might have recently come into port. After a number of abortive inquiries for "caracoles," we finally located a shrimper which had flash frozen several large sacks which we dumped out on the dock. The fishermen were somewhat puzzled by Charlie and me sorting out the prize specimens from this lot of by-catch, which they normally sold by the kilo. In the end, we each took home a good selection of *Hexaplex ambiguus*, *H. brassica*, *Melongena patula* and a shell I had not seen before, *Pleuroploca salmo* (Figure 5). Twenty-seven specimens weighed in at five kilos, which we bought at 17 pesos a kilo - not a bad deal at the end of a long day. We boiled them up on a stove at the creperie behind the hotel, discarding the meat and keeping the shell - the exact opposite of what their collectors had intended.

I enjoyed our week in Huatulco. It is a tranquil place which combines modern amenities with long stretches of unspoiled coastline. It is also rarely frequented by malacologists from North America. So, if any reader of *The Festivus* has occasion to dive there in the future, my advice is to ask the locals where to find the "sideburns" shell.

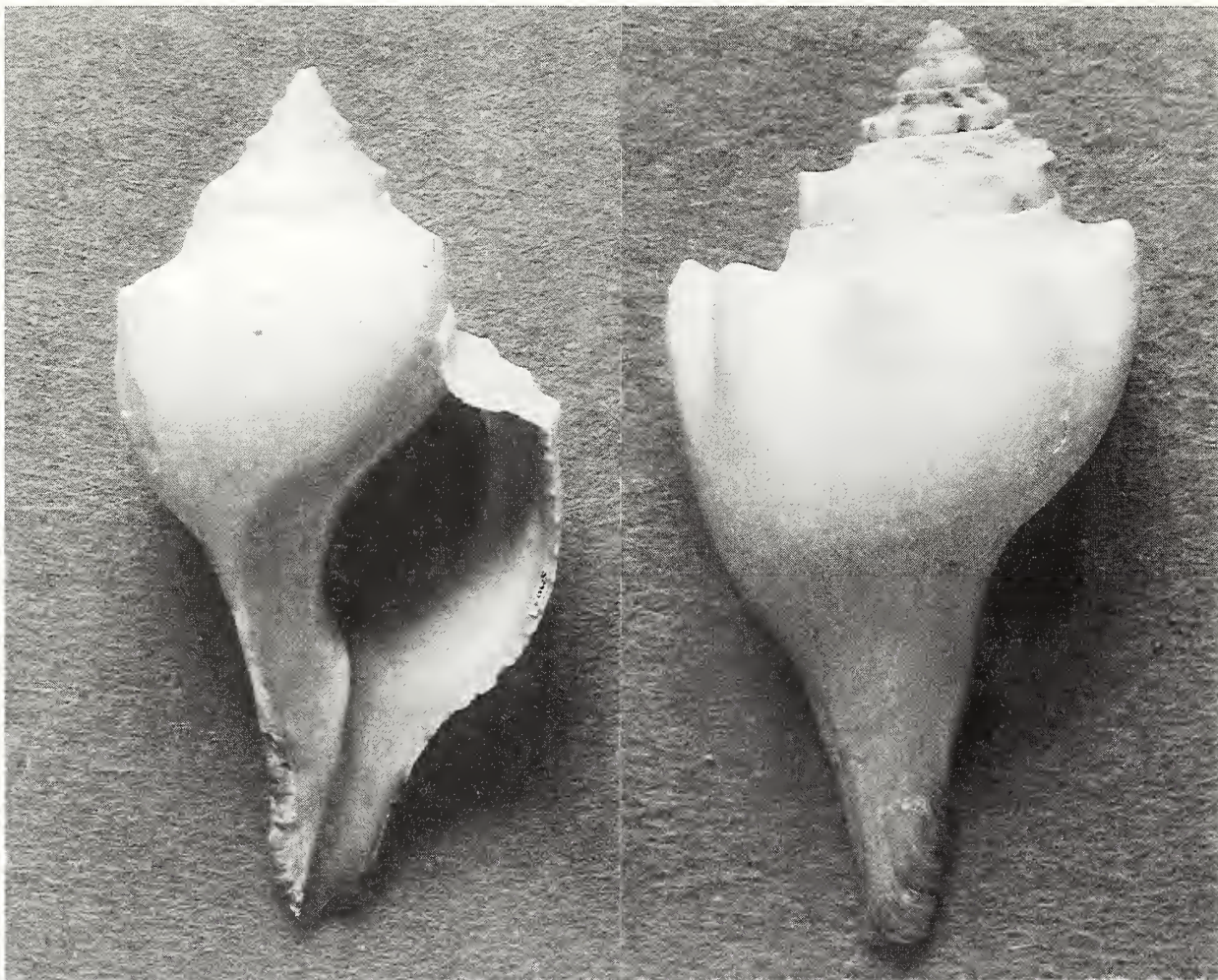
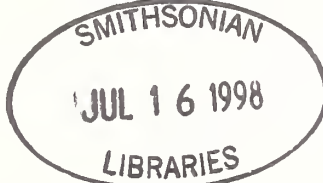


Figure 5. *Pleuroploca salmo* (Woods, 1828), two views of a 144 mm specimen trawled in the Golfo de Tehuantepec, February 1996.

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THE FESTIVUS

A publication of the San Diego Shell Club

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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

PROGRAM

Traveling and Exploring along the Jalisco and Nayarit Coasts

Carole and Jules Hertz will give a slide program on their four trips to Puerto Vallarta from 1994 to 1997, exploring the beaches of Bahía de Banderas, and those north and south, searching for elusive mollusks.

Meeting date: 16 July 1998
Shells of the month: Panamic shells

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting - June 18, 1998

President Wes Farmer called the meeting to order with about 30 people in attendance. The minutes of the May meeting were approved as published in *The Festivus*. Bill Romer announced that the pictures from the Christmas party were on the front table. They will be placed in the historian's book. Wes said that the Club meeting room has been reserved for us through the year 2000. Librarian Margaret Mulliner announced the two new books in the Club library and added that if anyone needs a library list, the new up-to-date list is now available through her. Books and Club t-shirts were on sale. Nola Michel won the door prize.

Carole Hertz introduced the winner of the Club's Science Fair award, Andrew Allshouse, a 10th grader at Serra High School, who studied how sound affects the environment of brine shrimp. He discussed how he controlled temperature, lighting, number of shrimp, etc. in three tanks. The study was done over a period of 31 days. One tank was exposed to no sound, another to helicopter noise and the third to jet ski noise. His results were unexpected. The helicopter noise increased the brine shrimp population whereas the jet ski sounds decreased the population. He concluded that the shrimp react to sound but there is no research on how this might impact these basic life forms in the food chain. He intends to continue his research. After answering questions from the attentive audience, Andrew was presented with an inscribed copy of his choice of book award, Barnes' *Invertebrate Zoology*.

In the absence of Don Shasky, Jules Hertz introduced the speaker for the evening, club member Richard Herrmann who started out in archaeology, became a dive master and underwater photographer and is now a professional photographer. His presentation was on a trip taken in May 1997 with Ron McPeak. The purpose of the trip was to collect invertebrates for biomedical research. The trip included Brittany on the west coast of France where the water is cold as well as the warmer waters off the island of Corsica. Richard mentioned how violent the weather is on the Brittany coast that made it impossible to dive for several days. They did manage to collect in the open sea and in the inlets. They found a great diversity of algae. Their goal was to collect at least 100 grams of each species

and to collect about 150 species. Their challenge was to freeze the specimens within two hours and safely ship them off to their destination. When they were not collecting, they enjoyed the gourmet cooking of their host (eating lots of spider crab) and enjoying the lovely, quaint and friendly surroundings. They moved on to Corsica, a beautiful mountainous island with strong separatist sentiments. Cork is a big local export. They found the visibility great through the Mediterranean but not rich diversity. The collection of sea grass is not permitted there but they found the abalone to be common and not considered very special. Richard's images and his outstanding presentation were enjoyed by all.

The delicious refreshments for the evening were contributed by Mary and Stan Regula. The meeting was adjourned to enjoy the treats and socialize.

Silvana Vollero

A Book Donation to the Club

Former member Jean Cate of Rancho Santa Fe has made a generous donation of over 30 books and reprints to the Club. Those books not already in the Club library will be added to its holdings and the rest will be sold with the proceeds going toward future library purchases.

Our appreciation goes to Jean for thinking of the Club for her donation.

Changes to the Roster

Change of address

Levin, Debra, 840 5th Ave. NW, Issaquah, WA 98027; (425) 837-0677; email: djlevin@alaska.net

Another New Book for the Club Library

The Club has purchased the newly published book, *Bivalves of Australia*, Volume 2 by Kevin Lamprell and John Healy. This volume has 288 pages, 112 plates (89 in color) and an addendum to vol. 1 with newly described species. This will complete the Club's set since the library already has Volume 1. The book will be available for circulation at the July meeting.

CYMATIUM (TURRITRITON) LABIOSUM (WOOD, 1828)
FOUND IN THE TROPICAL EASTERN PACIFIC

JULES HERTZ¹ & KIRSTIE L. KAISER²

Associates, Santa Barbara Museum of Natural History,
2559 Puesta del Sol Road, Santa Barbara, California 93105, USA

While the authors were collecting at Sayulita, Nayarit, México, on 27 January 1998, the junior author found a crabbed specimen of *Cymatium (Turritriton) labiosum* (Wood, 1828). The specimen was found intertidally under turnable rocks in sand and is shown in

Figures 1, 2. We had previously found *Cymatium (Turritriton) gibbosum* (Broderip, 1833) in this area but we knew that the new specimen was not an aberrant *C. gibbosum*. It took quite a bit of research before we tentatively identified the new find as *C. labiosum*. If



Figures 1,2. *Cymatium (Turritriton) labiosum* (Wood, 1828). (l to r) (1) Aperture view of specimen, collected intertidally, 27 January 1998, Sayulita, Nayarit, México, length 18.9 mm, leg. Kirstie L. Kaiser, Kaiser collection. (2) Dorsal view of specimen shown in Figure 1.

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our identification was correct, it would be the first reported occurrence of this species in the tropical eastern Pacific. The specimen was sent to Dr. William K. Emerson of the American Museum of Natural History for confirmation. He in turn conferred with Betty Jean Piech whose specialty is the Ranellidae. She confirmed our identification and was kind enough to share with us the data on the *C. labiosum* in her collection as well as information on lots in the Delaware Museum of Natural History.

Betty Jean has one small shell in her collection which she received as a gift that has a label indicating "Taboga Island, Gulf of Panama" as the locality and "H. H. Monroe 1954 leg." She spent an afternoon at the Delaware Museum of Natural History further researching the subject and they too have a *C. labiosum* specimen collected on the Pacific side of Panama, Lot No. 91449, with a label that says "ex. E. Bergeron, 1972" followed by the remark "Pacific side of Panama." We asked Dr. James McLean of the Los Angeles County Museum of Natural History and Dr. Henry Chaney of the Santa Barbara Museum of Natural History to check their respective collections for *C. labiosum* which might have been collected in the eastern Pacific, but neither museum had such material.

Henning & Hemmen (1993) list the distribution of

C. labiosum as "Indo-West Pacific (South and East Africa, Red Sea to Japan, New Zealand, Hawaii), Western Atlantic (N. Carolina to northern Brazil), Eastern Atlantic (Senegal, Canary Islands)." Betty Jean Piech has in her collection specimens from Somalia, Oman, South Africa, Brazil, the Atlantic side of Panama, the Turks and Caicos Islands, South Bimini in the Bahamas, Florida, a number of locations in the Philippines, Micronesia and West Australia. The specimen found by the junior author at Sayulita and those reported from the Pacific side of Panama extend the known distribution to the tropical eastern Pacific.

The authors are indebted to Dr. William K. Emerson and Betty Jean Piech for confirming the identification of the specimen from Sayulita, to Betty Jean Piech for sharing her data on the lots of *C. labiosum* in her collection and researching the collection at the Delaware Museum, to Dr. James McLean and Dr. Henry Chaney for searching their respective museum collections, and to David K. Mulliner for his fine photography.

LITERATURE CITED

HENNING, T. & J. HEMMEN

1993. Ranellidae & Personidae of the World. 263 pp., 30 pls.

NOTICE OF TWO FUTURE INTERNATIONAL MEETINGS

International Bivalve Meeting - 1999

A first announcement by The Malacological Society of London of its meeting "The Biology and Evolution of Bivalves" focusing solely on bivalves, which will take place 14-17 September 1999. It will be held at the University of Cambridge, UK. For further information contact: E. M. Harper, Dept of Earth Sciences, Downing St., Cambridge, CB2 3EQ, UK. Ph: UK 1223 332846; Fax: UK 1223 333450; email: emh21@cus.cam.ac.uk

MOLLUSCS 2000 Understanding Molluscan Biodiversity in our Region into the 21st Century.

A meeting bringing together people working on

molluscs in the Australasian and Indo-west Pacific regions. A major focus for the meeting will be to investigate new and improved ways of sharing and disseminating information and data throughout the region.

The meetings will be held from the 4th - 8th December, 2000 at The University of Sydney, Sydney, NSW, Australia.

CONVENORS: Dr. Winston Ponder, Department of Malacology, Australian Museum, 6 College Street, Sydney 2000. Phone (02) 9320 6120; Fax: (02) 9320 6050; email: winstonp@amsg.austmus.gov.au and Dr. Gee Chapman, Institute of Marine Ecology, University of Sydney, Sydney, NSW 2006. Phone: (02) 9351 4778; Fax: (02) 9351 6713; email: gee@bio.usyd.edu.au

TEN DAYS IN MAY: A TRIP TO LAS ISLAS TRES MARÍAS

MICHAEL SMALL

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Several million years ago, the long sliver of Baja California began to separate from the Mexican mainland along the San Andreas Fault. The same geologic process ripped a more compact piece of land from what is today the coastline of Jalisco, and carried it north to collide with the base of the emerging peninsula. The result of the collision was the mountainous Cape district of Baja; the result of its excision was the deep bight of Bahía de Banderas; and the result of its journey across a wide stretch of the eastern Pacific is a string of three teardrop shaped islands lying 60 to 90 miles north of modern Puerto Vallarta, named Las Islas Tres Marías.

Las Islas Tres Marías (Figures 1, 2) are well known to anyone who reads the geographic data given by Myra Keen (1971) in *Sea Shells of Tropical West America*. They were

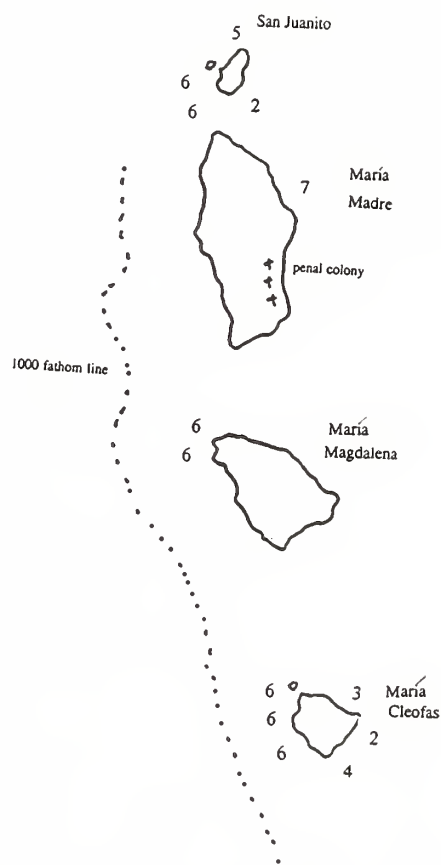


Figure 2. Map showing the Islas Tres Marías with collecting sites numbered. Map is not to scale.

visited by the *Velero III* during the Alan Hancock Pacific Expedition of 1939 (Fraser, 1943) and then again in 1957 by the Puritan-American Museum Expedition to Western México (Emerson, 1958; Emerson & Old, 1962). However, in the past forty years, no malacological work has been done on these islands.

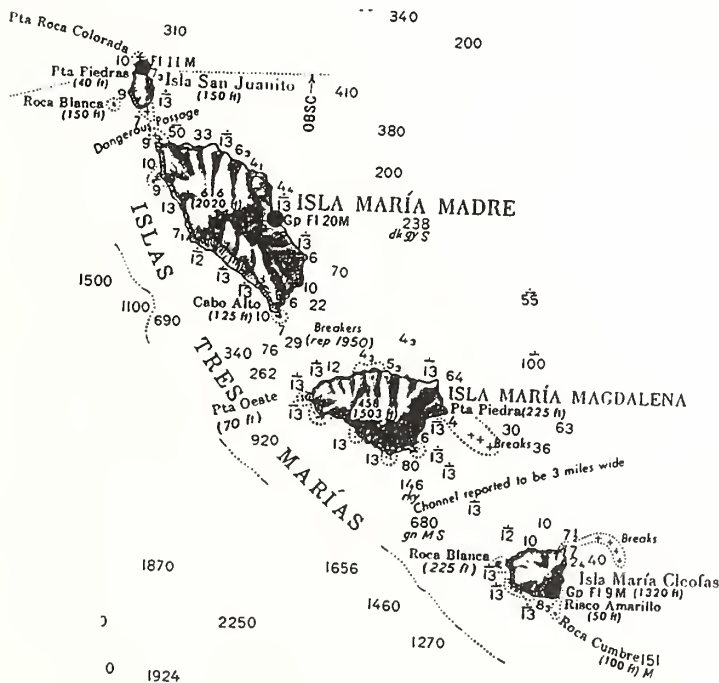


Figure 1. Navigational chart showing the Islas Tres Marías.

The reason for this is that Las Tres Marías are popularly known as México's "Devil's Island." México established its first penal colony on the largest of the three islands, María Madre, in 1920. The island became notorious as the destination for México's most dangerous offenders. In 1971, the government changed tack and decided to create a prison without walls. The penal colony is still there, but instead it is run as a large collective farm. Long term prisoners who have shown a record of good behavior are sent there with their families. They live in modest government-built bungalows, grow vegetables, raise cattle, and work in light industry. A ferry arrives once a week from Mazatlán bringing supplies and visitors to the island. The rest of the week the prisoners and their families are left to entertain themselves. Saturday evening dances reportedly enjoy a 100% attendance.

The Mexican government is proud of how it manages the penal colony and welcomes short-stay visitors in official groups who would like a tour of the installations. However, itinerant visitors on yachts mucking around sight unseen on the back side of the islands are most definitely not welcome. It is impossible to obtain permission from the harbor masters of any Mexican port to visit Las Tres Marías; and the maximum permitted is a brief overnight anchorage if you are sailing through. The islands are assiduously patrolled by a Mexican naval frigate which readily dispatches a detachment of marines armed with machine pistols to board any pleasure boat that strays into the area. Not only is the government concerned about escaping prisoners; it is equally concerned that these largely uninhabited islands could serve as a staging ground for narco-traffickers as well.

As a Canadian diplomat stationed in México City, I regarded political obstacles of the kind that keeps Las Tres Marías off limits as a professional challenge. Furthermore, I was intrigued by the idea of diving in an area which had not been surveyed in a generation. Our honorary consul in Mazatlán told me she knew the officer responsible for re-supplying the islands, so I began the permit process by writing to Mazatlán. After a couple of letters back and forth, the "process" was referred to the head office in México City. A formal audience was arranged for me with the Director-General of the Penitentiary Service. I arrived nervously and was shown into a very large office in which a very small man was seated stiffly on a sofa. I was beckoned to my seat with none of the usual small talk that enlivens meetings in México. The Chief Engineer of the Penal

Colony formally read out every line of my written application to his boss - who remained impassive throughout. I babbled inanely for a couple of minutes about our desire to study the marine fauna of the islands with no discernible effect. Then I pulled out a copy of a photographic catalogue which I had recently published of marine life along the Pacific coast and showed him a few plates of what we expected to see underwater. Rarely has a small gift proved so effective in my diplomatic work. The Director-General broke into a smile and declared, "I see your interest in this is sincere." A letter granting us permission to visit was issued five days later.

With authorization in hand, I was able to quickly organize a small party of six for the trip on the *Megalodon*, a diving/fishing boat out of San Diego, whose Captain, John Kirkpatrick, loves to go "where no man has gone before." Henry Chaney, John Jackson, Kirstie Kaiser, Gregg Hamann and Don Shasky made up the rest of the group. (Don had the distinction of being the only member of the group who had visited the islands before - he'd spent eight hours snorkeling there in 1967 while the resupply boat from Mazatlán unloaded supplies - and he arrived this time with copies of his correspondence with the prison librarian of the day.) We gathered at Kirstie Kaiser's home in Puerto Vallarta on the night of May 9th and embarked on the *Megalodon* at noon, after a little more paperwork in the port. A pair of orcas were frolicking on the surface and doing belly rolls, as we left the bay.

When we awoke on the morning of May 10th, all three of Las Tres Marías were clearly visible, marching northwestward in a line. The most southerly of the three is María Cleofas, followed by María Magdalena and then the largest, María Madre. They are steep granitic islands which rise to about 1200 feet, covered in dry tropical forest. There are few beaches or protected anchorages. The most spectacular of the three is María Madre, which has a wide grassy plateau that sweeps around its northern tip, fringed by cliffs. The terrestrial ecology of these islands is much more like the mainland, 50 miles to the east, than the remote oceanic islands like Socorro or Clarión.

Our first order of business was to report into the penal colony on the east side of María Madre (see map). I had been told to expect that we would be met by the Mexican navy a few kilometers from port, but in fact we sailed up and anchored in front of the quiet well ordered settlement without eliciting any reaction from the inhabitants. As we approached the jetty in our

Zodiac, we were met by the beefy Director of Security for the prison, who had a faxed list of our names in hand. First stop was the police post - a two story round building at the end of the jetty which Don informed us had been the prison library in his day. While the rest of our shore party wandered up and down the main street, chatted with the locals and admired the small fountain decorated with three bronze sharks - the symbol of the islands, John Jackson and I walked over to the ultra-modern prison administration building where we met the Deputy Governor and presented some small gifts we had brought for the families of the prisoners. These were well received, but then a small hitch appeared. Our formal permits only gave us leave to visit the two uninhabited islands - María Cleofas and María Magdalena - and the Deputy Governor did not feel he could let us dive around María Madre, as well, without approval from his boss who was visiting the mainland. In the end, we returned twice more before I finally received permission directly from the Governor for us to explore the north end of María Madre beyond the sight of the penal colony.

We spent ten days scouting dive spots along all main islands, and the various seamounts and islets around them. Most of the underwater terrain was typical for the coast of Mexico: steep boulders with crevices, sloping down to flat, gently sloping sand littered with smooth stones anywhere from 15 to 30 meters (50-100 ft). In many places, however, there was a particularly rich growth of purple gorgonians over the rocks, creating some very pretty seascapes. As it was May, the water had a number of temperature layers, ranging from 81°F on the surface to 68°F below 30 meters. This made dressing for a dive a bit challenging. Essentially you had to decide how deep you would dive before entering the water.

Over the course of the ten days, we found a number of notable dive sites. The first is a pinnacle that rises close to the surface in the channel between María Magdalena and María Madre (site 1 on map). The pinnacle consists of sharply folded layers of metamorphic rock covered in sea fans. The visibility was terrific and fish concentrations spectacular, culminating in a six foot grouper hovering around the high spot. It was the prettiest dive spot I have seen after three years of diving along the Pacific coast of Mexico. See Table 1 for a listing of all the collecting stations.

Less colorful, but equally surprising were the broad terraces of rock, covered in light sand that we found on the southeast side of San Juanito (site 2 on map). What

stood out were the *Strombus galeatus* scattered over the terraces, their backs covered in algae and a light coating of sand. Between us, we must have found 100 of them. I have only seen a colony of *S. galeatus* like this in one other remote spot - the islands of the Golfo de Chiriquí in Panamá. Their presence was a clear indicator that, thanks to the patrol boats on the surface, these islands are rarely fished, and hence the conch colonies in Las Tres Marias remain intact.

A third spot were the "dunes" of sand at the bottom of the shallow bays on the north side of María Cleofas (site 3 on map). Night diving in this habitat in about 12 meters (40 ft), Gregg Hamann and I found about twelve specimens of one of the scarcest Panamic cones, *Conus kerstitchi* (Figure 3). It is only known from Cabo San

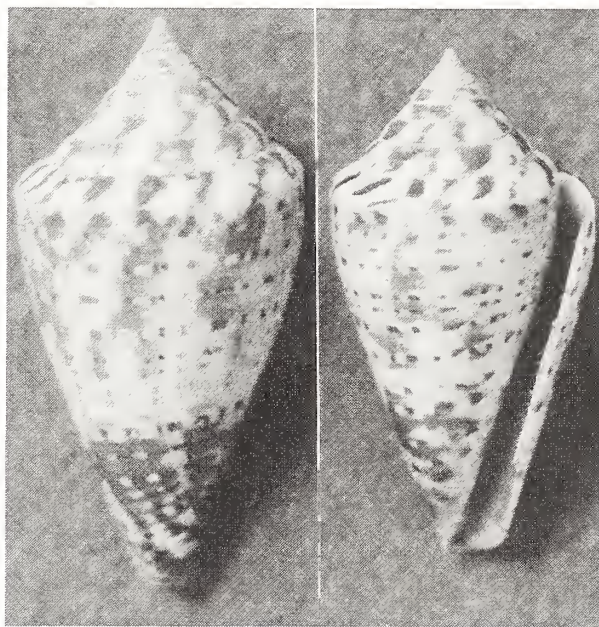


Figure 3. *Conus kerstitchi* Walls, 1978, two specimens (left: 33.5 mm, right: 30.2 mm) found off north side of María Cleofas, in 12 m (40 ft) on a night dive, May 1996.

Lucas and the coast of Nayarit, including Las Tres Marias. *Conus kerstitchi* is a small sand cone, and it takes sharp eyes to spot its small, pointed silhouette when skimming along the bottom. I learned over several nights to look for the right kind of bottom - fine sand at the base of dunes of coarser sand covered with a light scattering of shell and coral rubble. This kind of diving is second nature to Caribbean cone collectors, which is why Gregg excelled at it. Strangely, we found no other cone species at all in this habitat, and few other sand dwelling mollusks. The only other unusual species

which turned up on this bottom was a single specimen of the spiny and attractive *Cancellaria pulchra* (Figure 4).

One of the mollusks I hoped we would find is the beautiful *Oliva splendidula* which is at the north end of its range in Las Tres Marías. During all our night dives we found only one dead specimen until the afternoon of the last day when we were anchored off a cove on the southeast side of María Cleofas (see site on map). Returning to the boat around 17:00, while still broad daylight, John Jackson came across a single specimen tracking across a bright white sandy bottom in 8 meters (25 ft) of water under our boat. I have never before encountered an olive behaving like this in the daytime. The specimen was also unusual with a kind of cream and cinnamon coloring, much paler than the chocolate specimens I know from Panamá.

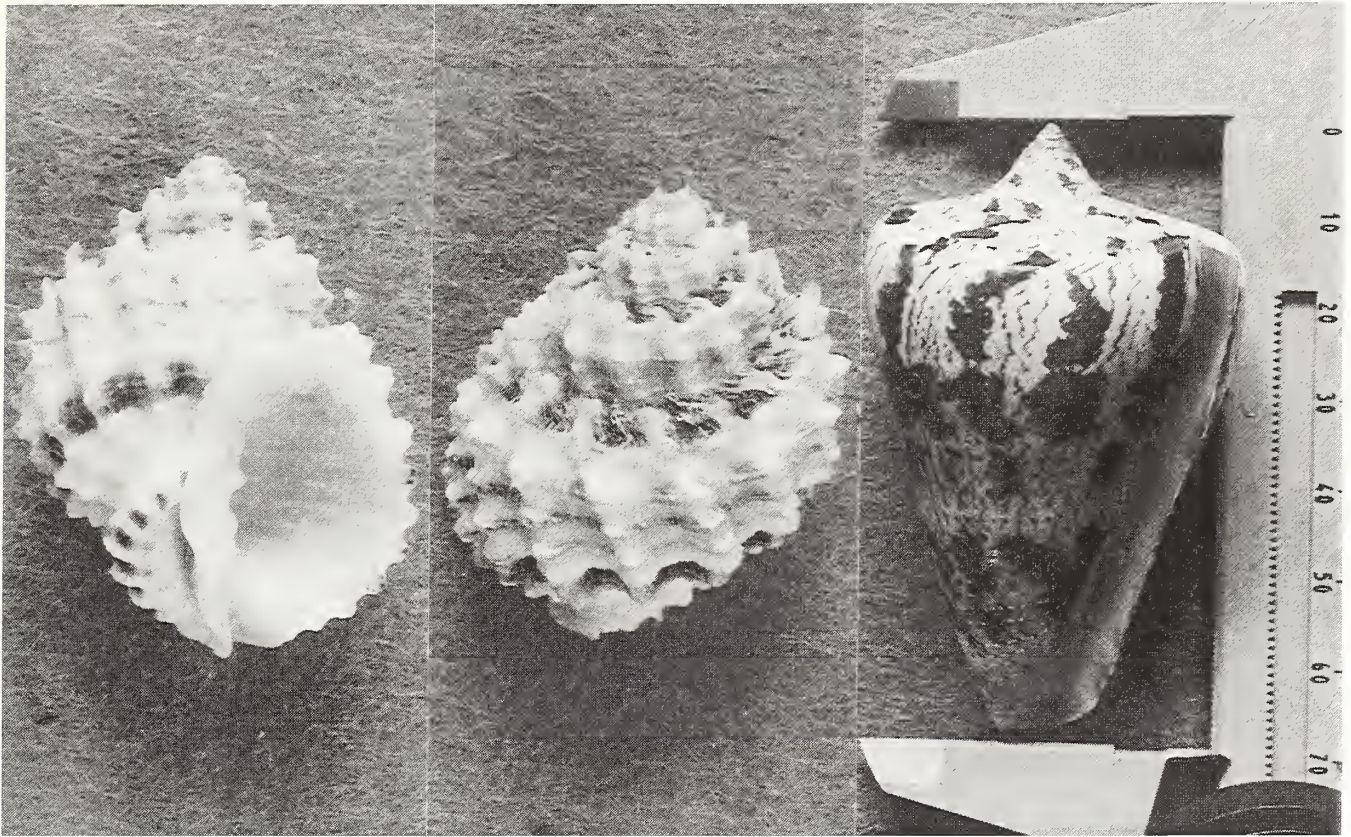
Another remarkable diving spot was the islet of Roca Blanca, just north of San Juanito at the north end of the archipelago. The lee side of this islet contains a series of large boulders, each creating an overhang, descending down to a sandy bottom at about 12 meters (40 ft). It looked to me to be an excellent spot for *Cassis* - and, indeed, we found several tantalizing pieces of freshly eaten *Casmaria vibexmexicana*. I never found a live specimen, sadly; but what I did find night diving there was just as memorable. We anchored in 21 meters (70 ft) of water away from the island and I had a ten minute swim over sloping sand until I reached the first boulder. There I stumbled across a turtle sleeping soundly under the overhang, its carapace resting on the sand. When looking for something small, like a *Casmaria*, it's always a surprise to encounter something big, like a turtle. However, it was much more of a surprise to encounter a turtle under the next boulder as well and then under the next one. In all, I counted twelve turtles under twelve boulders, each turtle facing in the same direction. I christened this spot "The Dormitory."

Between dives, we invested a great deal of time working with a large dredge that John Kirkpatrick had rigged up to the prow of the boat, using the anchor winch as a means of retrieval. John and his mate, Peter Boutelier spent hours scanning the bottom for flat bottoms in depths from 36 to 76 meters (150-250 ft), then dropping the dredge, then dragging it for a kilometer or more, and then retrieving, being careful not to damage the hull of the boat with the sharp edges of the dredge (see sites 6 on map). Once the dredge was over the side, and its contents dumped onto an old

piece of outdoor carpeting, the rest of us would pick through the contents. Each pull would take about forty minutes, and four times out of five it would come up empty. But at least one pull a day would justify the effort, yielding shells we could not find diving - such as *Conus arcuatus*, *C. fergusonii*, *Chicoreus peratus*, *Nassarius shaskyi*, *Distorsio minoruohnishii*, *Mitra swainsoni*, *Xenophora conchyliophora*, and more than a dozen pretty black and white *Bursa nana*. Bivalves were particularly abundant.

One dive, however, stood out above all others for me as the "peak experience" of the trip, after a number of nights of relatively meager finds night diving, Gregg Hamann decided we needed a new strategy. He became convinced that we needed to go much deeper than we had before - below 30 meters (100 ft) - and he found a spot he was sure would pay off: a sand fall, dropping off at more than a 45 degree angle from a shallow cove, just north of the penal colony on the east side of María Madre (site 7 on map). Gregg and I entered the water at the top of the sand fall and shot down as fast as we could swim. At 32 meters (105 ft), we hit a thermocline. The water temperature suddenly dropped below 70°F and the visibility dramatically improved. We finally stopped at 35 meters (115 ft), turned parallel to the sand wall and began to swim along it. The first thing to hit the beam of my torch was a huge chunky cone, which proved to be a *Conus archon* (Figure 5) measuring just over 70 mm. (The next largest specimen in my collection was 35 mm.) A couple of feet further on were several *Haustellum ruthae*, followed by *Fusinus dupetitthouarsi*, *Calliostoma rema*, *Subcancilla hindsii*, *Distorsio constricta* and then a small, live *Harpa crenata*. It was like moving your cart down a supermarket aisle. After 18 minutes at 35 meters, we had to surface to decompress. As we were working our way up the sand face, just before hitting the layer of warmer murky water, I found a glossy, high-spined shell I had never seen before lying in silt - a dead *Niso splendidula*, which earned considerable comment when I returned to the boat. Regrettably, we were unable to dive this spot a second time. Our dive computers had hit saturation point on the first dive, and the captain had to move the boat southward in preparation for our return to Puerto Vallarta. But Gregg's instincts certainly paid off on our only dive at this site. For a complete listing of the gastropods collected on this trip see Table 2.

The political isolation of Las Tres Marías will keep it off the beaten track for malacologists - and



Figures 4, 5. (4) *Cancellaria pulchra* Sowerby, 1832. One 30.5 mm specimen found off Isla María Cleofas, May 1996. (5) *Conus archon* Broderip, 1833. One 70.2 mm specimen found in 35 m off Isla María Madre, May 1996.

commercial fishermen - for years to come. The colonies of conch and turtle we found there are more effectively protected by the penal colony than if the islands had been declared a nature reserve. It is encouraging to know that a place reserved for human rehabilitation also serves the needs of a natural rehabilitation. It's an ironic harmony but one we can celebrate, quietly.

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Table 1: List of Collecting Stations

Station No.	Locality	Depth (ft.)	Station No.	Locality	Depth
1	Corbetena Rock	100	15	dredged off E coast of María Cleofas	180
2	dredged off Roca Blanca, María Cleofas	240- 420	16	N María Cleofas, N of reef, in rubbly sand	40
3	dredged SW María Cleofas	190	17	dredged in channel between María Madre & María Magdalena	150
4	María Magdalena	40	18	reef between María Magdalena & María Madre, at night	100
5	N María Cleofas	30	19	NE coast of María Madre	100
6	N María Cleofas, under rocks	30	20	Roca Blanca, San Juanito	60
7	NW María Magdalena, daytime	60	21	dredged off W coast of San Juanito	180
8	NW María Magdalena, at night	40	22	rock off NE coast of San Juanito	75
9	NW María Magdalena, shore	intertidal	23	dredged off Roca Blanca, San Juanito	180
10	N. María Cleofas, under rock	35	24	dredged E channel between María Madre & San Juanito	180
11	reef between María Madre & María Magdalena	40	25	*NE coast of María Madre, at night	120
12	Roca Blanca, María Cleofas	45		* BEST SITE	
13	Roca Blanca, María Cleofas, at night	70			
14	SW María Magdalena, daytime	40			

Table 2: List of Gastropods from Las Islas Tres Marias, May 10 - 20, 1996

Keen Number	Species	Locality	Depth (ft)	Other Stations	Dredged Only
87	<i>Calliostoma nepheloide</i>	N María Cleofas	30		
89	<i>Calliostoma rema</i>	NE Coast of María Madre, at night	120		
102	<i>Tegula ligulata mariamadre</i>	E coast of María Cleofas	20		
129	<i>Arena hindsiana</i>	East side of María Cleofas	50		
133	<i>Arene stellata</i>	East side of María Cleofas	50		
135	<i>Arena fricki</i>	rock off E María Cleofas	50		
157	<i>Astraea unguis</i>	N María Cleofas, under rocks	30		
276	<i>Folinia insignis</i>	E side of María Cleofas			
425	<i>Architectonica nobilis</i>	dredged SW María Cleofas	190	17, 25	1
440	<i>Turritella leucostoma</i>	dredged In channel between María Madre & María Magdalena	150		1
441	<i>Turritella mariana</i>	dredged off E coast of María Cleofas	180	25	
442	<i>Turritella nodulosa</i>	N María Cleofas, under rocks	30		
445	<i>Turritella rubescens</i>	Roca Blanca, María Cleofas, at night	70		
446	<i>Turritella willetti</i>	NE coast of María Madre, at night	120	25	
506	<i>Cerithium gemmatum</i>	N María Cleofas N of reef, in rubbly sand	40		
510	<i>Cerithium maculosum</i>	N María Cleofas	30		
515	<i>Cerithium stercusmuscarum</i>	N María Cleofas N of reef, in rubbly sand	40		
608	<i>Strombus granulatus</i>	N María Cleofas	25	25	
609	<i>Strombus galeatus</i>	NW María Magdalena, daytime	60	19, 20, 22	
610	<i>Strombus peruvianus</i>	N María Cleofas, under rocks	30	17, 22	
752	<i>Niso splendidula</i>	NE coast of María Magdalena, at night	120		
837	<i>Xenophora conchyliophora</i>	dredged off E coast of María Cleofas	180	23	1
863	<i>Natica grayi</i>	NW María Magdalena, at night	40		

871	<i>Natica elenae</i>	dredged off E coast of María Cleofas	180		1
879	<i>Polinices otis</i>	NW María Magdalena, at night	40		
882	<i>Polinices uber</i>	NW María Magdalena, at night	50		
919	<i>Cypraea albuginosa</i>	SW María Magdalena, daytime	40	17, 20	
922	<i>Cypraea isabellamexicana</i>	NW María Magdalena, daytime	40	20	
927	<i>Cypraea arabicula</i>	NW María Magdalena, daytime	40		
936	<i>Simnia aequalis</i>	NW María Magdalena, daytime	40		
--	<i>Simnia</i> sp.	NW María Magdalena, daytime	100		
935	<i>Cyphoma emarginatum</i>	dredged off E coast of María Cleofas	180		1
940	<i>Jenneria pustulata</i>	Reef between María Madre and María Magdalena	40		
942	<i>Malea ringens</i>	N coast of María Madre	100		
947	<i>Cassis coarctata</i>	María Magdalena	40		
948	<i>Semicassis centiquadrata</i>	NW María Magdalena, at night	50	19, 25	
949	<i>Casmaria vibexmexicana</i>	Rock off NE Coast of San Juanito	75	22	
952	<i>Ficus ventricosa</i>	dredged off E coast of María Cleofas	180	25	
955	<i>Cymatium wiegmanni</i>	dredged off E coast of María Cleofas	180	16	1
959	<i>Cymatium pileare</i>	NW María Magdalena, daytime	60		
961	<i>Cymatium gibbosum</i>	reef between María Magdalena and María Madre, at night	100		
962	<i>Distorsio constricta</i>	dredged off E coast of María Cleofas	180		1
963	<i>Distorsio decussata</i>	dredged off Roca Blanca, María Cleofas	40-70	21, 25	
--	<i>Distorsio minoruohnishii</i>	dredged in channel between María Madre & María Magdalena	150		1
964	<i>Bursa caelata</i>	Reef between María Madre & María Magdalena	50	25	
969	<i>Colubraria lucasensis</i>	dredged off E coast of María Cleofas	180		
972	<i>Colubraria siphonata</i>	NE coast of María Madre, at night	120		
981	<i>Chicoreus regius</i>	dredged SW María Cleofas	190	25	
982	<i>Chicoreus peratus</i>	dredged off Roca Blanca, San Juanito	180		1
--	<i>Haustellum ruthae</i>	dredged SW María Cleofas	190	25	
991	<i>Murexiella laurae</i>	rock off NE coast of San Juanito	75	22	
1002	<i>Hexaplex princeps</i>	Corbetena Rock	100		
1015	<i>Dermomurex myrakeenae</i>	N María Cleofas, under rocks	30		
1028	<i>Favartia incisa</i>	E side of María Cleofas	50		
1030	<i>Phyllocoma scalariformis</i>	N María Cleofas, under rock	35	20	
1071	<i>Quoyula madreporarum</i>	Roca Blanca, María Cleofas	45		
1088	<i>Purpura pansa</i>	NW María Magdalena shore	intertidal		
1098	<i>Bailya anomala</i>	E side of María Cleofas	50		
1115	<i>Cantharus sanguinolentus</i>	NW María Magdalena, at night	50		
1144	<i>Phos articulatus</i>	dredged off Roca Blanca, María Cleofas	40-70		1
1156	<i>Columbella haemastoma</i>	Roca Blanca, María Cleofas, at night	70		
1158	<i>Columbella major</i>	E side of María Cleofas	50		
1161	<i>Columbella sonsonatensis</i>	E María Cleofas	25		
1162	<i>Columbella strombiformis</i>	NW María Magdalena, daytime	40	10, 16	
1213	<i>Zafrona incerta</i>	rock off E María Cleofas	50		
1273	<i>Sincola gibberulus</i>	N coast of María Madre	50	25	
1281	<i>Strombina pulcherrima</i>	NW María Magdalena, at night	45		
1282	<i>Strombina recurva</i>	dredged in channel between María Madre & María Magdalena	150		1
1289	<i>Zetekia gemmulosa</i>	dredged off E coast of María Cleofas	180		1
1292	<i>Nassarius catallus</i>	dredged off E coast of María Cleofas	180	19	1
1299	<i>Nassarius gallegosi</i>	NW María Magdalena, at night	50		
1312	<i>Nassarius shaskyi</i>	dredged SW María Cleofas	190	19	1
1324	<i>Pleuroploca princeps</i>	N María Cleofas, under rock	35	19	

1328	<i>Latirus concentricus</i>	dredged SW María Cleofas	190	25	
1340	<i>Fusinus dupetitthouarsi</i>	dredged off Roca Blanca, María Cleofas	40-70	19, 22, 25	
1357	<i>Harpa crenata</i>	dredged SW María Cleofas	190	25	
1364	<i>Oliva porphyria</i>	NW María Magdalena, at night	50		
1365	<i>Oliva spicata</i>	NW María Magdalena, at night	40	19	
1366	<i>Oliva splendidula</i>	Roca Blanca, María Cleofas, at night	70		
1379	<i>Olivella gracilis</i>	NW María Magdalena, at night	40		
1387	<i>Olivella anazora</i>	NW María Magdalena, at night	40		
1397	<i>Vasum caestus</i>	N María Cleofas, N of reef in rubbly sand	40	22	
1421	<i>Mitra swainsonii</i>	dredged SW María Cleofas	190		1
1423	<i>Mitra crenata</i>	reef between María Madre and María Magdalena	50		
1428	<i>Mitra sponhi</i>	N. María Cleofas N of reef, in rubbly sand	40		
1429	<i>Mitra tristis</i>	NW María Magdalena, daytime	60		
1437	<i>Subcancilla erythrogramma</i>	N María Cleofas, N of reef, in rubbly sand	40		
1440	<i>Subcancilla hindsii</i>	dredged off Roca Blanca, San Juanito	180	25	1
1444	<i>Subcancilla sulcata</i>	Roca Blanca, María Cleofas, at night	70		
1450	<i>Cancellaria decussata</i>	dredged in channel between María Madre & María Magdalena	150		1
1455	<i>Cancellaria ventricosa</i>	dredged off W coast of María Cleofas	180		1
1460	<i>Cancellaria indentata</i>	dredged off E coast of María Cleofas	180		1
1462	<i>Cancellaria pulchra</i>	N. María Cleofas, N of reef, in rubbly sand	40		
1489	<i>Conus brunneus</i>	N. María Cleofas, N of reef, in rubbly sand	40		
1491	<i>Conus diadema</i>	Corbatena Rock	100	11,22	
1493	<i>Conus gladiator</i>	E. María Cleofas	20		
1495	<i>Conus tiaratus</i>	Corbatena Rock	100	20	
1496	<i>Conus arcuatus</i>	dredged in channel between María Madre & María Magdalena	150		1
1500	<i>Conus purpurascens</i>	dredged SW María Cleofas	190		1
1502	<i>Conus dalli</i>	NW María Magdalena, at night	40	16, 11, 17, 20	
--	<i>Conus kerstitchi</i>	Roca Blanca, María Cleofas, at night	70	4, 5, 11, 12, 25	
1506	<i>Conus recurvus</i>	dredged off E coast of María Cleofas	180		1
1510	<i>Conus archon</i>	NE coast of María Madre, at night	120		
1511	<i>Conus fergusonii</i>	dredged off E coast of María Cleofas	180		1
1514	<i>Conus nux</i>	N María Cleofas, under rock	35		
1516	<i>Conus tornatus</i>	dredged SW María Cleofas	190	12, 21	1
1520	<i>Terebra albocincta</i>	NW María Magdalena, at night	50		
1538	<i>Terebra glauca</i>	dredged off Roca Blanca, San Juanito	180		1
1540	<i>Terebra hancocki</i>	N María Cleofas, N of reef, in rubbly sand	40	17	
1554	<i>Terebra ornata</i>	Roca Blanca, María Cleofas, at night	70	25	
1556	<i>Terebra cf. plicata</i>	NE María Magdalena	50		
1560	<i>Terebra robusta</i>	dredged off E coast of María Cleofas	180	19	1
1566	<i>Terebra strigata</i>	NW María Magdalena, at night	50	19, 25	
1571	<i>Terebra variegata</i>	NW María Magdalena, at night	50	25	
1604	<i>Imaclava pilsbryi</i>	N coast of María Madre	100		
1647	<i>Polystira nobilis</i>	dredged, E channel between María Madre and Juanito	180		
1649	<i>Polystira picta</i>	dredged off E coast of María Cleofas	180		1
1659	<i>Knefastia olivacea</i>	N María Cleofas, under rocks	30		
1681	<i>Crassispira turricula</i>	dredged off E coast of María Cleofas	180		1
1685	<i>Crassispira discors</i>	E side of María Cleofas	50		
1707	<i>Crassispira trimariana</i>	N María Cleofas, N of reef, in rubbly sand	40		
1711	<i>Hindsiclava resina</i>	dredged off Roca Blanca, San Juanito	180	23, 25	
1797	<i>Tenaturris concinna</i>	dredged off E coast of María Cleofas	180		1
2236	<i>Bulla punctulata</i>	everywhere	30		

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THE FESTIVUS

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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

PROGRAM

Moais to Microshells - A View of Isla de Pascua

Club member Bret Raines will give a talk on his recent trip to Easter Island (also known as Rapa Nui),

Chile. He will have slides of the island as well as images of some of the mollusks he found there.

Meeting date: 20 August 1998
Shells of the month: Southern Pacific Shells

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CLUB NEWS

Missing Book from the Club Library

Will the member who borrowed the book, *Spiny Oyster Shells of the World Spondylus*, by Kevin Lamprell, please return the book to the Club library? Unfortunately, the member did not sign the library loan card in the book and so we cannot call him/her directly. Others would like to check out the book, so please return it promptly.

Members are asked to fill out the card in each book they borrow and then replace the card in the book (with borrower's name crossed out) when returning it. With this simple self-service method, the library can function without someone always on hand at the library cabinet. Loans of books are for one month only.

Minutes of the San Diego Shell Club Meeting - July 16, 1998

President Wes Farmer called the meeting to order at about 7:45 p.m. Approximately 30 members and guests were in attendance including out-of-town members Hugh Morrison and Simone from Australia, Carole Skoglund from Phoenix, Henry and Barbara Chaney from Santa Barbara and Kirstie Kaiser from Puerto Vallarta. After introduction of guests, the minutes of the June meeting were approved as published in *The Festivus*.

Librarian Margaret Mulliner announced that the new book *Bivalves of Australia, Vol. 2* by Lamprell and Healy is in the Club library and available for circulation.

The *Compendium of Seashells* (1998) by Abbott and Dance and published by Odyssey Publishing now has a newly designed cover and first pages. John Jackson has generously donated a copy to the Club library.

Bob Yin announced the upcoming Underwater Photo Festival and Bill Schneider was the winner of the door prize.

Don Shasky introduced the speaker for the evening, our own Carole Hertz. Carole discussed her various trips to Mexico with Jules. With Kirstie Kaiser's house as a home base, they explored areas to the north and

south of Puerto Vallarta. They collected intertidally and by dredging in some of their favorite shelling spots. Unfortunately some of those areas are being developed. Some great sites for collecting are being replaced with golf courses and resorts, though some of the views remain quite spectacular.

Refreshments for the evening were contributed by Twila Bratcher-Critchlow and Kay Klaus. The meeting was adjourned to enjoy the delicious refreshments and the opportunity to socialize.

Silvana Vollero

Changes to the Roster

New members

Brooks, Judith A., 215 S. Cottonwood Ranch Rd., Cottonwood, AZ 86326, (520) 639-4587

Brown, Chris, 4575 N. Ave. del Cazador, Tucson, AZ 85718

Changes of address

Levin, Debbi [new email & phone] (425) 837-0677;
email: levindj@worldnet.att.net

Raines, Bret [change of email] bkraines@eee.org

Big Sale at the August Meeting

Club t-shirts, sweatshirts and mugs will be on sale at the August meeting. Prices will be rock bottom - \$8 for t-shirts, \$10 for sweatshirts and \$7 for mugs (standard size). Postage will be additional for any mail orders. Also available for sale will be a group of donated books and periodicals. The Club needs the room in the locker. Come buy and save!

The September Party - September 19th

Mark your calendars for the September Party to be held at the Arnold's home on Saturday evening, September 19th. It will be a Grazing Party - another Munchie Madness - with attendees bringing all sorts of delicious finger-food munchies both hot and cold. Details at the meeting and map in the September issue.

Correction: In J. Hertz & Kaiser (1998) [*The Festivus* 30(3): 35-39], please change the distribution of *Colubraria* (*C.*) *lucasensis* from Isla de Malpelo to Isla Gorgona. The species has not been found at Isla de Malpelo.

GASTROCHAENA (ROCELLARIA) OVATA SOWERBY, 1834,
AND SCALENOSTOMA SUBULATA (BRODERIP, 1832),
SHARING THE SAME NICHE

JULES HERTZ¹ & KIRSTIE L. KAISER²

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While diving at 10-27 m at Isla del Coco, Costa Rica (5°30'15.8"N, 87°03'21.4"W), on 23 March 1997, the junior author found a live specimen of *Gastrochaena* and a live specimen of *Scalenostoma subulata* (Broderip, 1832), sharing the same hole in a piece of live *Pocillopora* sp. The piece of coral was inadvertently broken while diving, and within a large branch was a smooth-sided, seemingly, completely enclosed burrow containing the *Gastrochaena* species and the specimen of *Scalenostoma subulata*. The junior author had previously found dead specimens of *S. subulata* and live specimens of *Gastrochaena* in broken live coral but had never before seen them together. Figures 1-3 show the preserved specimen of *Gastrochaena*. Figure 1 is an anteroventral view showing the animal within the shell, Figure 2 is a dorsal view perpendicular to the large axis and Figure 3 is an external view of one of the valves. Figure 4 is an external view of a single valve from a second specimen from Isla del Coco.

The genus *Gastrochaena* Spengler, 1783, family Gastrochaenidae is described by Keen (1971) as having shells similar to Limas, but having no ears and no radial sculpture. "The two valves gape widely on the anterior ventral part and are held together by a small exterior ligament that rests on a platform. The burrowing habit protects the animal. Burrows are in soft rock, other shells or coral heads ..." Nielsen (1986) states that all members of the family Gastrochaenidae "have whitish valves with a wide ventral gape; the valves are almost

smooth or with fine, more or less sharp concentric ridges. The periostracum is thin and inconspicuous in most species, but in a few species it is thicker and contains numerous calcareous denticles." He also stated that in the genus *Gastrochaena* "The siphons are completely fused, and the boring has accordingly only one siphonal canal, which may have lateral longitudinal ridges indicating the two siphons. The valves are not divided into two areas with different sculpture and the periostracum is usually thin and lacks calcareous denticles." Boring is considered to be a combination of chemical and mechanical methods (Carter, 1978). Nielsen (1986) found six species in the family Gastrochaenidae in his collecting at Phuket, Thailand, two in the genus *Spengleria* Tryon, 1862, and four in the genus *Gastrochaena*; all were found only in the dead parts of coral.

Gastrochaena species have not been previously reported from Isla del Coco, Costa Rica. We originally thought that the specimen was either *Gastrochaena (Rocellaria) ovata* Sowerby, 1834, which is reported from South Carolina to the West Indies, Bermuda, and San Diego, California, to Ecuador or *Gastrochaena gigantea* (Deshayes, 1830) whose distribution is Indo-Pacific, from Mauritius, the Seychelles, the Gulf of Aden, Pakistan, the Maldives, Chagos, Burma, Penang, Singapore, the Gulf of Thailand, the northern coasts of Australia, New Caledonia, and Hawaii (Pearl Harbor). The external surface of many species in the genus *Gastrochaena* have a plain sculpture of concentric

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growth lines and therefore all species in the genus appear similar when viewed externally, although the species will differ in the amount of pedal gape. The specimens from Isla del Coco seem similar to the photographs of *Gastrochaena* (*Rocellaria*) *ovata* figured by Carter (1978: 27) and also appear similar to the drawings for *Gastrochaena gigantea* (Deshayes, 1830) in Nielsen (1986: figs. 4C, 5C), Sowerby (1878: pl. III, fig. 15) and Deshayes (1846: figs. 7-8). Nielsen (1986) lists *G. indistincta*, *G. lamellosa*, *G. macroschisma* and *G. philippinensis*, all of Deshayes, 1855, as well as *Rocellaria hawaiiensis* Dall, Bartsch & Rehder, 1938, as synonyms of *G. gigantea*.

Photographs of the specimens were sent to Dr. Joseph G. Carter, University of North Carolina, for review, and he identified the species as "*Gastrochaena* (*Rocellaria*) *ovata* Sowerby, 1834, or perhaps better as *Rocellaria ovata* Sowerby, 1834." He stated "that it is closely related to *Rocellaria denticulata* (Deshayes, 1856) which differs in having distinct denticulations on the anteroventral margin." *R. denticulata* was originally described from Colombia. Carter (pers. comm.) also stated that "*Gastrochaena* (*Rocellaria*) *gigantea* (Deshayes, 1830), originally described from the Indian Ocean, is similar to *ovata*, but is commonly much larger. It might be only subspecifically distinct from *ovata*, but this decision must await population-level studies and anatomical details of eastern Pacific *ovata*." He also believes (Carter, pers. comm.) that *Gastrochaena* and *Rocellaria* are probably distinct at the generic level, although he did not think so in his 1978 paper. He



Figures 1-3. *Gastrochaena* (*Rocellaria*) *ovata* Sowerby, 1834. (1top) Ventral view perpendicular to the plane of the pedal gape of preserved specimen. Leg. K. L. Kaiser, 23 March 1997, Isla del Coco, Costa Rica, SCUBA, 10-27 m, H₂O 82-84°F, length = 20.5 mm, height = 11 mm, K. L. Kaiser collection. (2 center) Dorsal view perpendicular to the large axis of specimen shown in Figure 1. (3 bottom) Lateral exterior view of valve of specimen shown in Figure 1. Photos: D. K. Mulliner.

believes that they are different anatomically, with *Gastrochaena* having typically much longer siphons and a much more recent fossil record.

The live collected specimen of *Scalenostoma subulata* (Broderip, 1832) found in the same hole as the *Gastrochaena gigantea* is shown in Figure 5. The genus *Scalenostoma* Deshayes, 1863, was placed (Warén, 1980) "in the family Eulimidae because the larval shell and the early post-larval whorls of *Scalenostoma* resemble those of many eulimids more than any other family." Two of the species,

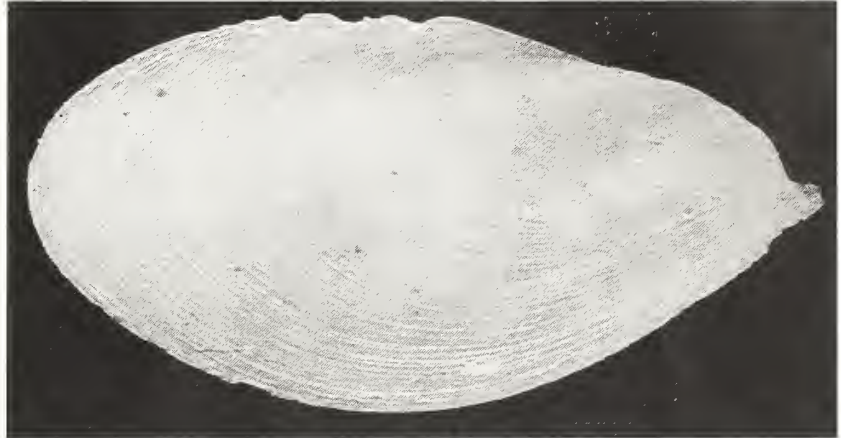


Figure 4. Lateral exterior view of valve from second specimen of *Gastrochaena (Rocellaria) ovata* Sowerby, 1834, collected at Roca Sucia, WNW Bahía Wafer, Isla del Coco, Costa Rica, 18-24 m, 23 May 1985, length = 22.6 mm, height = 11.3 mm, K. L. Kaiser collection. Photo: D. K. Mulliner.

Scalenostoma subulata (Broderip, 1832) and *S. carinata* Deshayes, 1863, are parasites on coral (Warén, 1980). *Scalenostoma* is highly exceptional in the family Eulimidae in feeding on corals rather than echinoderms. *S. subulata* is circumtropical in shallow water. Although *S. subulata* is "highly variable, it can always be recognized by the flat larval and convex post-larval whorls" (Warén, 1980: figs. 52, 56, 60, 62-65). The specimen shown here is nearly identical to a specimen figured by Warén (1980: figs. 64-65). Unfortunately, the junior author did not collect the branch of *Pocillopora* with the burrow in which the two species were living.

Scalenostoma subulata (Broderip, 1832) was originally named by Chemnitz (1795: 286) as *Helix corallina* in a non-binomial work. The following translation by Dr. Michael Hollman of Chemnitz's original German description is herein included because of its unique style which includes a brief description, followed by a lengthy tale of circumstances under which Chemnitz obtained the shell.

"Shell turreted, white, glossy, smooth, fragile and translucent, the five lower whorls cylindrical, but the spire pointed, with a very fine tip, aperture semicircular.

Shall I consider this strange genus [species] a marine or a landsnail? I will leave this question for others to answer, after reporting in the following how and where I found it. I once obtained several wagon loads of coral, madrepores, millepores, måandrites and such. These had been used as ballast by a skipper coming from the sugar islands of the West Indies. He had a less than full load and for lack of stones filled his lower cargo deck with these corals, which then were given to me. To my great delight I found a lot of new genera [species] of snails in the holes and crevices of these sea creatures. Among them were these cute turreted snails which often



Figure 5. *Scalenostoma subulata* (Broderip, 1832). Apertural view of specimen collected by K. L. Kaiser, 23 March 1997, Isla del Coco, Costa Rica, SCUBA, 10-27 m, H₂O 82-84°F, height = 15.2 mm, K. L. Kaiser collection. Photo: D. K. Mulliner.

were surrounded by them such that I had no explanation how they might have gotten in there, how they could have lived within the stone, and what business they had to be located there. So they are marine snails, some will say, because they were found stuck in the holes of such madrepores and corals. But what if these corals had been lying around piled up on the beach for a long time, to be eventually burnt in West Indian lime factories, as corals were usually used to produce lime? Isn't it possible that land snails could have been sneaking into those holes and crevices while the corals were still wet, soft and fresh? This question probably will have to be left open for the time being. These little turreted shells are as white and translucent, but also as delicate and fragile as the finest glass. I am counting twelve stories [whorls] on the larger specimens, of which the lower ones are pretty similar in size and cylindrical in shape while the upper ones all of a sudden are set off to end in a very sharp tip."

The first recorded binomial name for this species was *Stylifer subulatus* Broderip, 1832. Warén (1980) lists many synonyms for this species and places it in the genus *Scalenostoma*. This is the first report of *Scalenostoma subulata* (Broderip, 1832) at Isla del Coco, Costa Rica.

What is the association, if any, of *Scalenostoma subulata* and *Gastrochaena ovata*, within a single hole in live coral? Was this a fortuitous occurrence or is there a symbiotic relationship between the two species and/or with their mutual host? Morton (1988) in his book, *Partnerships in the Sea: Hong Kong's Marine Symbioses*, talks of coral galleries in which different bivalves live in holes in live coral with other creatures such as sponges, crabs, shrimps and polynoid worms. The calcium carbonate of coral is very soft and easily bored, either by mechanical abrasion or chemically by chelating enzymes. Most coral borers bore into dead coral skeletons, but a few, however, are of living corals and thus in some kind of association with their host. Morton (1988) gives as an example *Lithophaga hanleyana* which, until recently, was thought to be a dead coral borer, but it is now known that the bivalve larva penetrates the living coral tissue and bores down into the skeleton. The larval and adult stages must have chemical defenses against the stinging cells of living coral and the bivalve can feed and grow protected by both the host's skeleton and the living coral tissue around it. Morton & Scott (1989) discuss Hong Kong bivalves and their hosts, among which are species in the families Montacutidae and Galeommatidae which live in coral crevices or coral gallery communities.

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The authors are indebted to Paul Valentich Scott and Dr. Eugene V. Coan for location of pertinent literature on the *Gastrochaena*, to Dr. Michael Hollmann for translation of the Chemnitz description of *Helix corallina* from German to English, to Dr. Joseph G. Carter for critical reading of the manuscript and identification of the *Gastrochaena* species, and to David K. Mulliner for the fine photography. Carole M. Hertz was most helpful in reviewing the many drafts and making positive suggestions for improving the paper.

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MURACYPRAEA WOODRING, 1957 (GASTROPODA: CYPRAEIDAE)
IN THE UPPER MIOCENE AND LOWER PLIOCENE
LATRANIA FORMATION (IMPERIAL GROUP)
OF IMPERIAL COUNTY, SOUTHERN CALIFORNIA

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Introduction The cypraeid genus *Muracypraea* Woodring, 1957, first appeared in the Miocene of Trinidad (Schilder, 1939) and is known throughout the southern Caribbean region from the Miocene to the Recent. On the Pacific coast of the Americas, the only previously documented records are from the Pliocene of Ecuador (Pilsbry & Olsson, 1941) and the middle Miocene of Baja California Sur, México (Hertlein & Jordan, 1927; Smith, 1984). The only other published Pacific Coast record is in a faunal list for the Imperial Group of Imperial County, California (Powell, 1988), derived from unpublished work of T. E. Stump (1972). Efforts to confirm this report resulted in locating several additional specimens that are clearly referable to *Muracypraea*, confirming the presence of *Muracypraea* in the Imperial Group and its survival into the lower Pliocene in the proto-Gulf of California.

Background *Muracypraea* was erected by Woodring (1957) as a subgenus of *Cypraea* Linnaeus, 1758, to include the Recent species *Muracypraea mus* (Linnaeus, 1758) and its fossil relatives in the complex typified by *M. henekeni* (Sowerby, 1850). For many years *Muracypraea* was treated as a subgenus of *Siphocypraea* Heilprin, 1886,¹ and subsequently as a subgenus of *Barycypraea* Schilder, 1927 (Liltved & Le Roux, 1988; Kay, 1990). Recent systematic work raised *Muracypraea* to full generic rank (Kay, 1996; Bradner

& Kay, 1996). The *Muracypraea* literature contains a plethora of species and subspecies names. Woodring (1959) synonymized many of these names under *M. henekeni*. Specimens of *M. henekeni* from Panamá and the Dominican Republic, however, show clear morphological differences between the two regions, those from Panamá being noticeably humped and those from the Dominican Republic being significantly flatter, raising some doubt as to the validity of Woodring's synonymy.

Species of *Muracypraea* are found in Miocene and Pliocene formations throughout the Caribbean, with well documented records from the Dominican Republic, Trinidad, Venezuela, Colombia, Panamá, and Costa Rica (Woodring, 1959). Documented Pacific Coast records are limited to Ecuador and Baja California Sur, México (Hertlein & Jordan, 1927; Pilsbry & Olsson, 1941).

Stratigraphy The Imperial Formation (Hanna, 1926) was recently raised to group rank by Winker & Kidwell (1996). The Imperial Group crops out in central Riverside County and western Imperial County, California. The northern (Riverside County) and southern outcrops (Imperial County) are believed to represent two distinct depositional episodes, the northern ones being radiometrically dated as older than 6.0 Ma (late Miocene) (Powell, 1987) and the southern ones being dated by benthic foraminifera as younger than 5.2 Ma and most likely 5.2-3.9 Ma (late Miocene to early Pliocene) (Stump, 1972; Bell-Countryman, 1984; Winker & Kidwell, 1996).

¹ The publication date of *Siphocypraea* has usually been considered to be 1887. However it has been shown that the correct date is 1886 (Petit & Wilson, 1986).

The southern outcrops of the Imperial Group are divided into the Deguynos Formation (lower Pliocene), Latrania Formation (lowest Pliocene-uppermost Miocene), and Fish Creek Gypsum (upper Miocene). The Latrania Formation is further divided into the Wind Caves (lower Pliocene), Jackson Fork (lower Pliocene), Stone Wash (lowest Pliocene-uppermost Miocene), Lycium (upper Miocene), and Andrade (upper Miocene) Members (Winker, 1987; Winker & Kidwell, 1996). The Andrade Member is composed of coarse grained to fine grained, poorly cemented sandstone with pockets of limestone. In the Andrade Member in Fossil Canyon (Alverson Canyon) the preservation of aragonitic species is poor. In most cases, only internal and external molds are preserved. Calcitic species in the Ostreidae and Pectinidae, and the Echinoidea (e.g., *Arbacia*, *Chelyaster*, *Encope*) are typically well preserved. The Jackson Fork Member is a sandstone and conglomerate facies of very limited extent at the base of Vallecito Mountains in the North Fork of Fish Creek (Imperial County), and is notable for the excellent preservation of aragonitic species. This member represents a shallow, near shore marine environment (Winker, 1987).

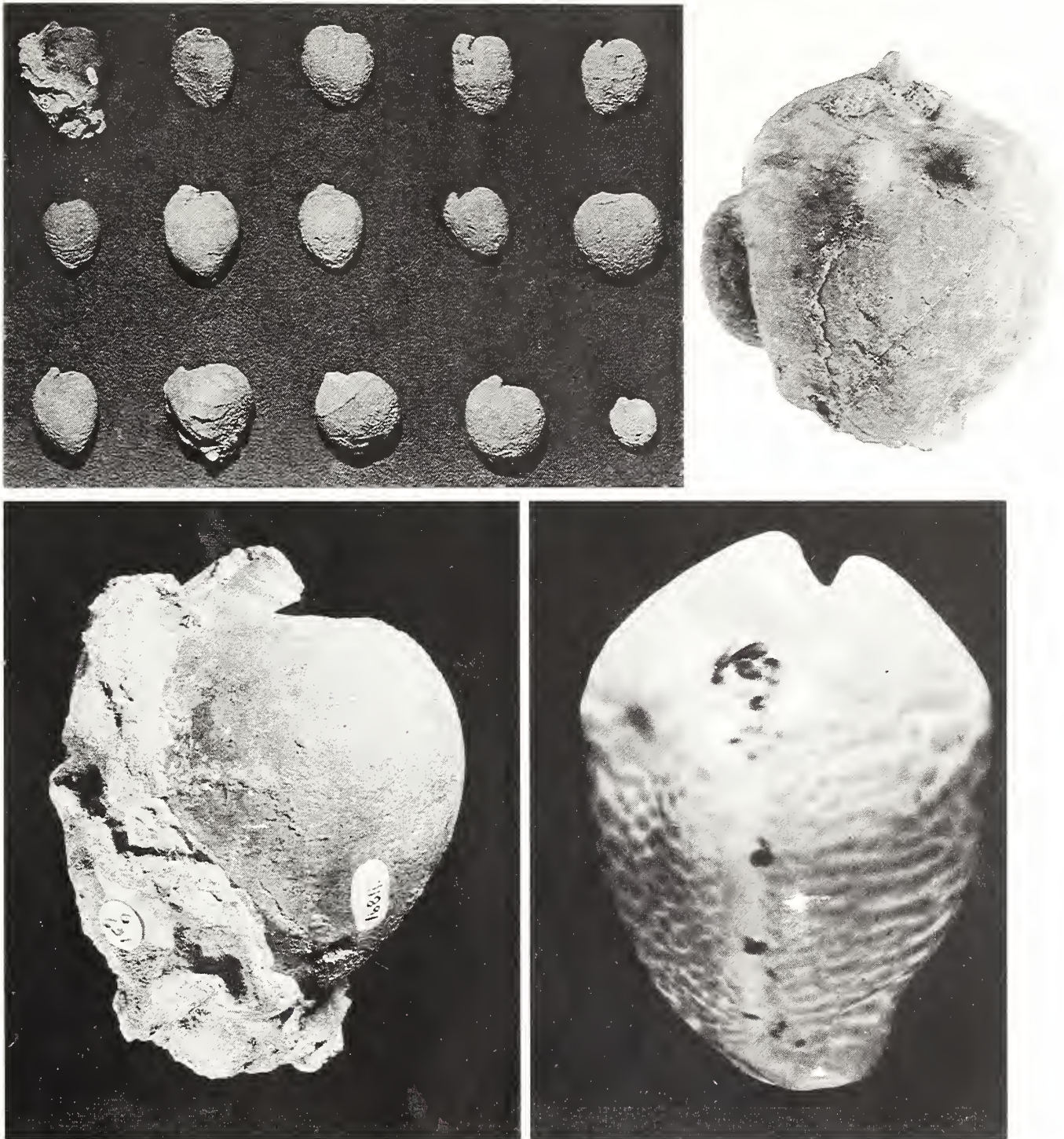
Materials Studied Sixteen specimens were obtained from the collections of the Los Angeles County Museum of Natural History, Invertebrate Paleontology (LACMIP), San Diego State University, Geology (SDSU), the University of Chicago, Study Collection and the private collection of the author. The locality data for the University of Chicago specimen is very precise and can be traced to a specific shell bed in the Jackson Fork Member in the North Fork of Fish Creek, Imperial County (Winker, 1987). Locality data for the remaining specimens are very general and simply state "Coyote Mountain" or "Fossil Canyon". All of them are from the Andrade Member of the Latrania Formation and were probably collected at various localities in or near Fossil Canyon. In all cases the specimens are internal molds with very little shell remaining. Figure 1 shows a representative suite of specimens from the Andrade Member. The specimens range in length from 35 to 87 mm. Figure 2 shows the single specimen from the Jackson Fork Member. Figures 3, 4, 5, and 6 show dorsal and ventral views of the best Andrade Member specimen (LACMIP 16811) compared with *Muracypraea mus* (Linnaeus, 1758). Figure 7 shows the holotype of *M. amandusi* (Hertlein & Jordan, 1927) (CAS 6614801) from Baja California Sur, México.

The described *Muracypraea* species are generally rather short relative to width and generally rhomboidal in form. These characters are shown in the genotype species *Muracypraea mus* and separate the members of this genus from all other Recent Cypraeidae from the Americas. The two Recent cypraeid species most comparable to the *Muracypraea* are *Bernaya teulerei* (Cazenavette, 1846) and *Barycypraea fultoni* (Sowerby, 1903) from the western Indian Ocean. Characteristics of *Muracypraea* are clearly exhibited by all of the specimens shown in Figures 1, 2, 3, and 5. Because there are no other, Recent or fossil, Pacific Coast cypraeids with these characteristics, the specimens examined are referred to *Muracypraea*. Examination of *M. henekeni* from both Panamá and the Dominican Republic and *M. cayapa* (Pilsbry & Olsson, 1941) from Ecuador leads to the further conclusion that the Latrania Formation specimens represent one or more undescribed species quite distinct from the described Pacific coast species. There appear to be two forms in the material examined. The first form is inflated (*M. n. sp. A*), the second form is somewhat flattened and ovoid in outline (*M. n. sp. B*).

The inflated form (*Muracypraea n. sp. A*) is distinguished from *M. cayapa* and from the dorsally humped Panamá specimens of *M. henekeni* by its broad centrally located hump which differs from the posterior location and peaked form of *M. cayapa* and Panamá specimens of *M. henekeni*. The flattened form (*M. n. sp. B*) is distinguished from *M. cayapa* and from the dorsally humped Panamá specimens of *M. henekeni* by the lack of a dorsal hump and a generally oval outline. The oval outline of *M. n. sp. B* distinguishes it from the deltoidal *M. amandusi*. *M. n. sp. B* is closest in form to Dominican Republic specimens of *M. henekeni*, however the geographic distance and direct development life cycle of the *Muracypraea* indicates that they are distinct species.

Stump (1972) reported *M. amandusi* and *M. n. sp.* in his thesis. He based his observations on the A. Morlin Childers Collection, which cannot now be located by me. However, the SDSU material is part of Stump's (1972) thesis material and confirms his report of *Muracypraea* in the Andrade Member. However, his report of *M. amandusi* cannot yet be confirmed. The single specimen from the Jackson Form Member extends the stratigraphic range of *Muracypraea* upward into the lower Pliocene.

Conclusions The presence of the cypraeid genus



Figures 1-4. (1) *Muracypraea* Fossil Canyon, Imperial County, California, SDSU and LACMIP collections. (2) *Muracypraea* n. sp. North Fork, Fish Creek, Imperial County, California, University of Chicago Collection. Photo: L. T. Groves (3) Dorsal view *Muracypraea* n. sp. A, Fossil Canyon, Imperial County, California, LACMIP 16811. (4) Dorsal view *M. mus*, Terry S. Arnold Collection.



Figures 5, 6. (5) Ventral view *Muracypraea* n. sp. A, Fossil Canyon, Imperial County, California, LACMIP 16811. (6) Ventral view of *M. mus*, Terry S. Arnold Collection.

Muracypraea has been confirmed in the upper Miocene and extended to the lower Pliocene of the Imperial Group of southern California. This documented occurrence extends the geographic range northward by over 750 kilometers and the North American west coast stratigraphic range upward by 5-7 Ma to the lower Pliocene. The specimens examined represent one or more undescribed species distinct from the described Pacific coast species.

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During the course of my research Alison Kay provided access to Dominican Republic material in her possession and valuable advice. Emily and Harold Vokes of Tulane University provided access to the extensive collection of Panamá and Dominican Republic material in their possession and provided the original observation that the Panamá and Dominican Republic *henekeni* have "always appeared to be different." Lindsey Groves of the Los Angeles County Museum of Natural History arranged for the loan of specimens and took the photograph in Figure 2, George Kennedy of San Diego State University arranged for the loan of specimens and made extremely valuable comments on a



Figure (7) *Muracypraea amandusi* holotype, CAS 6618401.

draft of the manuscript. of Natural History. Dr. Thomas Deméré of the San Diego Museum of Natural

History provided access to their collections. Warren Blow of the National Museum of Natural History consulted their extensive holdings for possible specimens, and Susan Kidwell of the University of Chicago provided advice on Salton Trough stratigraphy and arranged for the loan of the best specimen of *Latrana Formation Muracypraea* seen. I thank all for their aid, advice and patience.

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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

COME TO THE SEPTEMBER PARTY!

(There is no regular meeting this month. See Club News.)

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting - August 20, 1998

President Wes Farmer called the meeting to order about 7:35 p.m. There were about 27 members and one guest in attendance. The minutes of the July meeting were approved as published in *The Festivus*. There was no financial report since Treasurer Margaret Mulliner was absent.

Carole Hertz and Terry Arnold reminded everyone of the date change for the September Party. Please bring "munchie" food and a warming plate, if necessary. Wes informed everyone that Ken Norris, a UC professor, passed away recently. He was a naturalist whose favorite subject was dolphins.

Don Shasky introduced the speaker for the evening, Bret Raines, Club member from Victorville, who came to tell us about his fascinating three-week trip to Easter Island. The island has less than two thousand permanent residents and is a remote province of Chile. The island is famous for its Moai statues, the tallest being 65 feet. There are also many interesting petroglyphs of birdmen, octopus, etc. He said that the Easter Island Foundation was a great resource. Its purpose is to create a library and record the history of the island. He mentioned that the landmark work of Dr. Rehder in 1980, "The Marine Mollusks of Easter Island (Isla de Pascua) and Sala y Gómez" still left many questions unanswered. Much of the island's coast is inaccessible, the weather is changeable, the waters are very rough, and there are only three sandy beaches. For these reasons, diving and collecting were sometimes difficult. Most of the shells that he and Mary Taylor found were less than 10 mm and were dead specimens. One of the most interesting was a specimen with two siphons.

Members enjoyed his program immensely and appreciated his photography of these minute species. There were many questions following the presentation.

Terry announced that a DNA researcher is looking for local *Donax gouldi* with animal. If anyone has any or finds any, contact Terry. The winner of the drawing was Mary Taylor. Refreshments for the evening were brought in by the Romers, the Lindahls and Don Shasky. The meeting was adjourned to enjoy the

delicious treats and each other's company.

Silvana Vollero

The September Party - September 12th

The September Party will be held at the Arnold's home this Saturday evening, September 12th. Bring all sorts of delicious finger-food munchies both hot and cold to the Grazing Party - another Munchie Madness. Festivities will begin at 6:00 P.M.

For last minute information, call Terry & Marty Arnold at 235-8181.

Writing for *The Festivus*

The Festivus publishes papers on all aspects of malacology (descriptions of new species are not accepted at this time) as well as more popular articles related to mollusks. Book reviews, meeting announcements etc., are also included. All papers accepted are published completely free of charge and authors receive five complimentary copies. For those wishing additional reprints, orders can be submitted to the editor before publication and the author is charged only actual costs.

Authors should send manuscripts in duplicate, double spaced, pages numbered consecutively, with literature citations and figure legends, where applicable. Line drawings, color prints, slides and b&w photographs are gladly received, and specimens can also be photographed by *The Festivus* by prior arrangement. Photographs need not be mounted.

In addition to two hard copies, manuscripts on disk are welcomed. *The Festivus* uses a PC with Windows 95 and WordPerfect 7.0 and can utilize diskettes with compatible format.

All papers received are acknowledged and sent out for critical evaluation. Authors will receive the reviewed manuscripts for their consideration and response. One copy only of the revised/corrected final manuscript (with diskette, if possible) need be sent to the editor for publication.

Manuscripts should be sent to Carole M. Hertz, Editor, at 3883 Mt. Blackburn Avenue, San Diego, California 92111, USA.

CONUS ADAMSONII: THE LIVING ANIMAL

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LARRY DERR

1147 Mountain View Circle, Napa, California 94558, USA

Conus adamsonii Broderip, 1836, has been a very coveted cone by collectors because of its relative rarity and spectacular beauty. An excellent review by Raybaudi Massilia (1992) records the nomenclatural history of the taxon. In 1825 the cone was described by G. B. Sowerby I who named it *Conus cingulatus*, but this was a preoccupied name. Broderip subsequently described it as *C. adamsonii* in 1836, while in 1839 Jay described it again as *Conus rhododendron*. In the *Hawaiian Shell News*, Purtymun (1977) reported the species as occurring in American Samoa. This was followed by Hart (1991, 1992) who reported the collecting of live shells in the Cook Islands, discussed the habitat, reviewed the literature and reported the range of the species. Hart reported the cone to be a sand dweller in deep water both inside and outside the reef off Aitutaki, Cook Islands. Potter (1993) extended the range to New Caledonia. Coomans et al. (1979) designated American Samoa as the type locality based on Purtymun's previously noted citation. It is now known that the species ranges from French Polynesia to the Solomon Islands and the Coral Sea (Röckel, Korn & Kohn, 1995).

In March of 1996, Larry Derr and I had the opportunity to spend several weeks on Aitutaki, an atoll in the Cook Islands, scene of the articles by Hart. Larry was conducted on several dive trips by the local dive master who had himself collected several living *C. adamsonii*. On each trip Larry was assured that *C. adamsonii* had been found at that day's dive site by the dive master. Unfortunately, Larry did not find the elusive cone at any of these places. Finally the dive master was requested to go "somewhere he had not

found the cone" and on the first such trip Larry was rewarded with a live beauty.

The shell was found outside the fringing reef in about 85 feet of water in a pocket in the reef, covered by dead calcareous algae. Fanning along the bottom revealed the cone. One week later Larry repeated this feat with a second live beauty (44 mm) in the same habitat and depth. The animal was quite active at night and we were able to obtain pictures of the living animal (Color Plate I, Figures 1, 2). The animal is cream colored, mottled with purplish brown markings which blend with markings on the shell, very spectacular! *Conus adamsonii* is still alive and well on Aitutaki, but still uncommon.

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FUSINUS FREDBAKERI ON EGGS AT BAHÍA LA CHOLLA, NAYARIT, MÉXICO

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2559 Puesta del Sol Rd., Santa Barbara, CA 93105, USA

At the invitation of Carol Skoglund, my husband Jules and I spent three lovely days at Bahía la Cholla, Nayarit, México, [31°20'N, 113°36'W] during a period of low tides from 10-12 March of this year. On our third and last day of observing during the early morning low tides, I found 17 specimens of *Fusinus fredbakeri* Lowe, 1935, on eggs near the boat launching area. They were found intertidally in the midtide zone on a -4.0 ft low tide at 7:40 a.m.

In the three days of searching the tide flats in the area, Jules found one living specimen of *F. fredbakeri* on the first day and neither of us found any living specimens the second day even though we had walked across the bay. To find this cluster of specimens with eggs, on the third day, in an area without rocks and in shelly rubble was, indeed, a surprise.

The 17 specimens were from 27.9 x 12.5 mm to 51.2 x 20.1 mm, some considerably larger than the 38 x 15.5 mm described by Lowe (1935). The animal of *F. fredbakeri* can be seen as being red-orange with irregular whitish spots unevenly spaced and having black eyes on the tips of the eyestalks (Color Plate I, Figures 3, 4). The shell color varied from an all-over cream with slightly darkened areas between varices and whitish to pale lavender within the aperture in some specimens to brownish-shelled individuals with dark brown between the varices and deep purplish-brown in the aperture. Some specimens showed the remains of a thick, light tan periostracum.

The *F. fredbakeri* were all on or under an eroded valve fragment of *Dosinia ponderosa* (Gray; 1838) on a mud and shell rubble substrate with the egg capsules on both the top and underside of the valve fragment (Color Plate, Figure 5). I counted a total of almost 300 egg capsules with masses of orange eggs within the capsules. The egg capsules and the specimens on them were photographed in a studio setup on our return. The two

specimens shown on the bivalve fragment are 49.5 x 19.7 mm and 32.1 mm x 15.2 mm. Figure 1 shows two views of a single capsule, drawn after the capsules had been placed in alcohol.

My appreciation to David K. Mulliner for taking the photographs and to Joyce Gemmell for the camera lucida drawings of the egg capsule.

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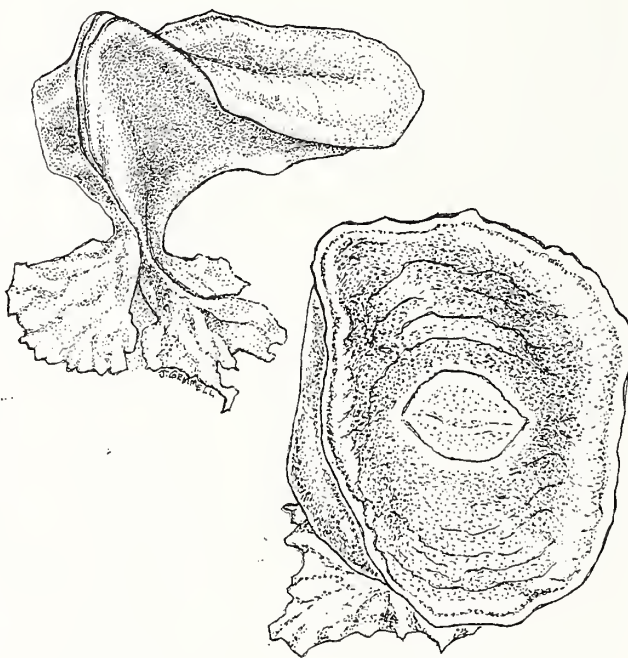


Figure 1. Two views of an egg capsule of *Fusinus fredbakeri*. Camera lucida drawings by J. Gemmell.

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Color Plate I, Figures 1-6. (1, 2 [top row left to right]) *Conus adamsonii* Broderip, 1836 at Aitutaki, Cook Islands. Animal on rock with foot extended; note closeup showing proboscis and eyestalks in Figure 2. Photos: G. E. Metz. (3-5 [center row & bottom left]) *Fusinus fredbakeri* Lowe, 1935, on eggs at Bahía la Cholla, Sonora, México. Photos taken in studio setup by D. K. Mulliner. (6 [bottom row, right]) *Haliotis cracherodii* Leach, 1814, with withering foot disease. Photo: R. Herrmann.

A BLACK ABALONE WITH “WITHERING FOOT DISEASE” FROM THE SAN DIEGO AREA

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The “withering foot disease” has severely affected California abalone species, predominantly the black abalone, *Haliotis cracherodii* Leach, 1814, but also *H. rufescens* Swainson, 1822 (Taniguchi, 1994). It was first discovered in 1986 (Haaker et al., 1992) as a disease of unknown cause affecting large proportions of black abalone populations. Gardner et al. (1995) identified a bacterium in the Rickettsiales group affecting the digestive system as the causal agent behind the disease. The new disease was also one of the factors that prompted the complete closure of the abalone fisheries in California waters.

When the second author first moved to San Diego in 1976, the black abalone were easily found intertidally, (if you knew where to look) in the rocky shore beaches of La Jolla. They were also abundant in the Channel Islands until the mid-1980s (Jack Engle, pers. comm.) and now they are no longer seen. Dr. Jack Engle, Director of Research for the Channel Islands Research Program (CIRP), directs an ongoing monitoring program which looks at a series of stations in the subtidal and intertidal environments of the California coast and the Channel Islands. The CIRP surveys look at trends in population dynamics for a wide range of animal and algae species in the marine environment, considering 10 to 15 species as index or “key” species. Species such as abalone are considered important indicators of general overall health of the marine environment.

In late 1995, Cayucos, in central California, was the northernmost location where “withering foot disease” had been observed in black abalone. Figure 1 shows a specimen of the black abalone, held by Jack

Engle, severely affected by the withering foot syndrome. Color Plate I, Figure 6 shows a closeup of this abalone specimen.



Figure 1. Jack Engle with diseased specimen of *Haliotis cracherodii*.
Photo: R. Herrmann.

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GARDNER, GEORGE R., JOHN C. HARSHBARGER, JAMES L. LAKE, THOMAS K. SAWYER, KATHY L. PRICE, MARK D. STEPHENSON, PETER L. HAAKER & HEIDI A. TOGSTAD

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BOOK NEWS

News of recent molluscan publications of interest to our readers is listed below.

The Taxonomic Atlas, Volume 8 - The Mollusca - Part 1, The Aplacophora, Polyplacophora, Scaphopoda, Bivalvia and Cephalopoda. 1998.

250 pages, comb bound, laminated cover.

Published by the Santa Barbara Museum of Natural History at \$39.00 (\$4.00 postage per volume with multiple copies at discount).

Contributing authors include E. Coan, A. Scheltema, D. Eernisse, R. Shimek, P. V. Scott, and F. G. Hochberg. Included are keys, detailed descriptions and illustrations (drawings and photographs) for 95 species including seven new species and extensive glossaries.

For further information, contact Paul Valentich Scott, editor, at the Santa Barbara Museum of Natural History, 2559 Puesta del Sol Rd., Santa Barbara, CA 93105, USA or phone: 805-682-4711, ext. 319 or email: phscott@sbnature.org

Treasure of Russian Shells, Volume 2. Trichotropidae. by R. Egorov and D. Alexeyev. 1998.

36 pages, 2 plates (drawings of radulae and representatives of described species in natural size). Price: \$15.00 + postage (\$3 registered surface; \$5 registered air).

Includes a total of 26 species in 7 genera from Russian seas and adjacent waters with synonymies, type material, description, distribution and ecology. All

species illustrated with distribution list and map of three newly described species.

To order, send to Roman Egorov, 3rd Vladimyrskaya, 14-24, 111401 Moscow, Russia or email romae@glasnet.ru

A sixth printing (1998) of the *Compendium of Seashells* by Abbott & Dance, done by Odyssey Publishing, is now available for \$ 60.00 plus handling and shipping. In this high quality reproduction, the text is the same as in the original edition, but has the errata sheet from the third printing included on page 411. The cover is a laminated, bright, colorful one (without dust jacket) and several pages have been added i.e., a b&w photo of the authors and list of their publications.

To order, send to Mal de Mer Enterprises, 792 Evergreen Dr., West Hempstead, NY 11552 or phone 516-481-0456 or email maldemer@compuserve.com

For those who have been subscribers of *Hawaiian Shell News*, it is announced that the final index for 1992 through 1996 is complete and ready to mail. For airmail USA and Canada send \$6.00, for all others send \$8.00.

Send check in US dollars to Bill Ernst, 94-641 Hikianalia Pl., Miliani, HI 96789.

It has also come to our attention, via Tom Rice, that L. Raybaudi will cease publication of *World Shells* with the final issue of 1997. The reason given was the advancing age and uncertain health of Dr. Raybaudi.

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THE FESTIVUS

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Annual dues are payable to San Diego Shell Club.
Membership (includes family). Domestic \$15.00;
Overseas (surface mail): \$18.00, (air mail): \$30.00;
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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

PROGRAM

Marine Biodiversity Studies of the Californias

Dr. Hans Bertsch, marine biologist and diver, has been photographing the natural history of Baja California for many years. He will give a slide program

and discuss his current research project at Punta Eugenia and Bahía Tortugas (Pacific coast of Baja California).

Meeting date: October 15, 1998

Shells of the month: Shells of the Baja outer coast

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CLUB NEWS

The September Party Munchie Madness - September 12th

This year's annual September Party of the San Diego Shell Club was again graciously hosted by Terry and Marty Arnold. Though a smaller group than usual, there was a rich variety of fare and delightful conversation throughout the evening. Along with our local members, Dave and Lucille Green were in town from Houston, Texas, and joined in the fun.

A big vote of thanks goes out to Terry and Marty for again opening up their home for this festive annual affair.

Kim Hutsell

The Club's Annual Christmas Dinner Party

The next social event for the Club and the final one for the year is the annual Christmas party to be held on Saturday evening, December 5th. Mark your calendars and be sure not to miss this event. There will be more news and the listing of menu choices and prices in the November issue.

Club Receives "A Sheller's Directory..."

The Club library has received its free copy of the 22nd edition [1998-99] of Tom Rice's *A Sheller's Directory of Clubs, Books, Periodicals & Dealers*. As a generous gift for filling out the information form, the 114-page Directory has been sent to the Club. It will be available for circulation at the October meeting.

For those interested in purchasing the 22nd edition, the cost is \$6.95 plus postage.

Notices of Three Upcoming Malacological Meetings

4th International Abalone Symposium

The 4th international Abalone Symposium will be

held at the University of Cape Town, South Africa, 6-11 February 2000. There will be presentations dealing with Biology, Fisheries and Aquaculture of Abalone as well as workshops on topics of special interest to members of industry.

For further information, contact Peter Cook or Ken Findlay at the Centre for Marine Studies, University of Cape Town, Private Bag, Rondebosch 7701, Cape Town, South Africa or phone +27-21-650 3631; fax: +27-21-6503283 or e-mail: cms@physci.uct.ac.za

First Notice: Western Society of Malacologists, Annual Meeting,

The 32nd annual meeting of the WSM will be held at California State University, Fullerton, 13-17 June, 1999. A symposium on "Current research on west coast molluscan paleontology" is planned.

For further information and/or ideas on this symposium, contact either: Lindsey T. Groves, Natural History Museum, LA County, Malacology and Paleo. Sections, 900 Exposition Blvd., Los Angeles, CA 90007, or phone: (213) 763-3376 or email: lgroves@nhm.org or Richard L. Squires, California State University, Northridge, Dept. Geological Sciences, 12111 Nordhoff St., Northridge, CA 91330 or phone: (818) 677-2514 or e-mail: richard.squires@csun.edu

Big Fall Sale at the October Meeting

Consider doing your holiday shopping at the October meeting. There will be an array of nature and shell books, used but in fine condition, available at the meeting for rock-bottom prices. Also, there are still some t-shirts and sweatshirts available which will still be at the bargain prices of \$8 and \$10 respectively. You may also order (or buy from those on hand) the beautiful San Diego Shell Club mugs.

Come on time so that you have time to browse. All purchases are on the honor system - just put the money in the jar.

Correction: In the article by C. M. Hertz in the September issue [The Festivus 30(9):98], Bahía la Cholla should be listed as in Sonora instead of Nayarit.

FAUNAL LIST OF SHELLED MARINE MOLLUSKS INHABITING THE NORTHERN JETTY, MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

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Abstract: Over a seven-year period, at irregular intervals during wintertime low tides, 75 species of shelled marine mollusks living along the western end of the northern jetty at the southern tip of the Marina Peninsula, Los Angeles County, were recorded. A pronounced ecological zonation was noted among the inhabitants, both upon the jetty and within the ecological habitats at its base, and certain species were found to be characteristic of each habitat. A faunal list documenting all taxa that were recorded during this study was assembled.

Introduction

From 1988 to 1994, a survey to identify marine invertebrates living along the northern jetty at the westernmost end of Marina del Rey, Los Angeles County, California, was conducted. This section of seawall is immediately west of the Grand Canal/Ballona Lagoon outflow. It is bounded on the north by Dockweiler State Beach and on the south by the entrance channel that connects the marina to Santa Monica Bay (Figure 1).

A fauna dominated by mollusks, together with crustaceans, echinoderms, poriferans, and other marine invertebrates, was encountered during the study. This study deals solely with the shelled mollusks that inhabit the jetty, and includes an adjacent exposed, sandy stretch of Dockweiler State Beach, as well as a sandflat/mudflat that lies at the base of the southern side of the seawall and drops off into the entrance channel. Seventy-five species of shelled mollusks were identified during the study. In addition, several species of nudibranchs and at least one species of octopus that are not listed here inhabit the jetty.

Methods

A majority of the research was conducted diurnally during wintertime low tides to -1.9 ft. Some nocturnal investigation was also undertaken, and a data-gathering trip was made at least once during an early morning

summertime low tide. Research was performed at irregular intervals on weekends and holidays, and only in rare instances for more than two consecutive days. However, days spent at the study site aggregate to several months of observation.

Observations included the distribution of species by habitat, the relative abundance or scarcity of a species and its population density, the size of individual specimens within a species, the spatial relationships between species, and interspecific relationships. Some of these observations were incorporated into previous studies covering intertidal carnivorous mollusks of western Los Angeles County (Rader 1994, 1995).

An attempt was made to collect a living example of each taxon recorded to document its existence at this locality. Specimens were cleaned and shells labeled with species identifications. Data recorded with each specimen included locality, date of collection, and habitat (sandy beach, sandflat, rocks at base of jetty, etc.). Voucher specimens have been deposited into the Malacology collection of the Natural History Museum of Los Angeles County for future reference. The collection site equals LACM Malacology locality 88-410, and voucher specimens were deposited with that reference number.

History and Physical Features of the Study Area

According to Dr. James A. Fawcett, Chief of Planning, Los Angeles County Beaches and Harbors

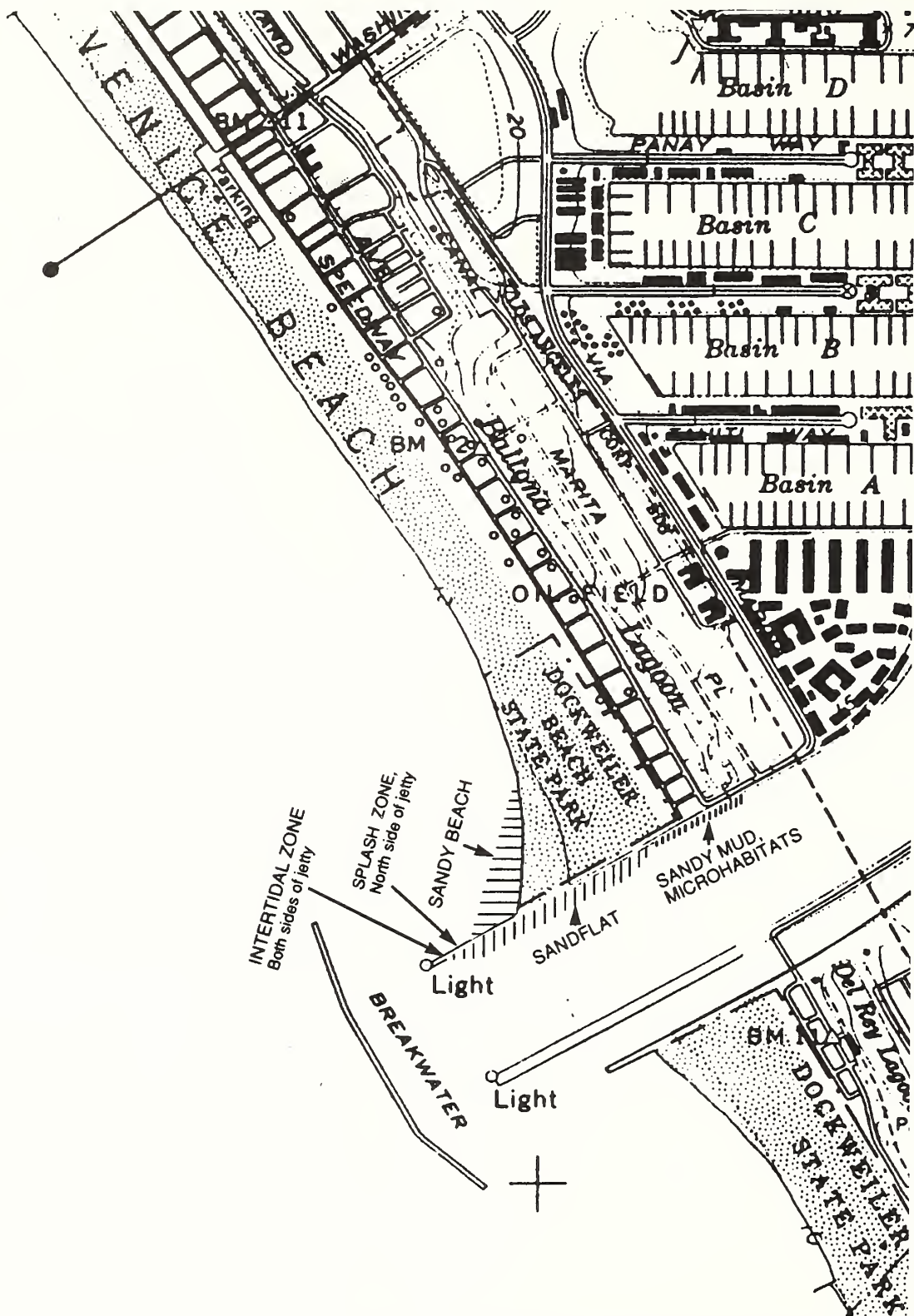


Figure 1. Location of LACM Malacology locality 88-410 on Venice Quadrangle, US Geological survey 7.5 Minute topographic map (1964, revised 1972), Los Angeles County, California, 1:24000.

Department, the marina was constructed in a wetland area that was dry much of the year. Excavation, which commenced in the early 1960s, was dry, with an earthen plug left at Dockweiler State Beach barring seawater flow into the project. The jetties, comprised of 15 to 20 vertical feet of quarry rock, were inserted before seawater inundated the project when the plug at Dockweiler State Beach was removed. A detached breakwater designed to mitigate the effects of wave surge was constructed in 1965 after completion of the project.

The entrance channel was dredged by the Army Corps of Engineers after seawater filled the project. It is presently -15 feet at 0.0 tide and has a width of 300 yards near its mouth in Santa Monica Bay.

A sandflat located on the south side of the jetty along the entrance channel extends from a point west of the Grand Canal/Ballona Lagoon outflow to approximately the light at the western end of the seawall. Sandflat formation is largely the result of wind-blown sand from Dockweiler State Beach being carried over the top of the jetty and accreting on the south side. This is a clean, well-sorted, well-rounded, fine-grained sand that is composed largely of grains of plagioclase, quartz, and biotite. A lesser source of sand accretion on the flat may be due to the longshore current, which flows in a north-south direction during summer months and from south to north during the winter (Figure 2).

At the base of the sandflat there is a precipitous dropoff into the channel that is visible during times of extreme low water. This dropoff should be considered dangerous to waders and should not be closely approached.

In the vicinity of the Grand Canal/Ballona Lagoon outflow, suspended mud particles in water flowing out of the canal at low tide have commingled with wind-blown sand to produce a sandy mud. This substratum grades into a muddy sand and then into clean sand the farther west one moves from the tide gate. Mud load in the canal was probably increased during the clean-up programs that took place in the 1980s and again in 1995.

Individual blocks of quarry rock that have come to rest below the main body of the jetty form ecological islands, termed microhabitats by Ricketts, Calvin, and Hedgpeth (1985), in the surrounding substratum. In addition, man-made debris in all manner of forms has provided an unexpected source of habitation for a variety of marine creatures.



Figure 2. Sandflat along the entrance channel exposed at low tide. The flat was formed by the accretion of sand grains blown over the top of the jetty from Dockweiler State Beach. Numerous infauna burrow into the sandy substratum and are sometimes uncovered by runoff channels and by erosion caused by the wakes of passing boats.

The ecology of the marine environment in the marina has a well-documented history in studies that were first undertaken in 1976 by the Harbors Environmental Projects of the University of Southern California (HEP, USC), and continued with several lapses in periods covered through June of 1996. At that time, the project was resumed by scientists from Aquatic Bioassay and Consulting Laboratories, Inc., Ventura, California. The Aquatic Bioassay survey program for July 1996 - June 1997 consisted of monthly water-column surveys, semi-annual fish surveys, and an annual benthic sediment survey (Aquatic Bioassay, 1997).

Ecological Zonation

Six habitat zones are herein recognized at LACM 88-410: Splash Zone [SZ]; Intertidal Zone [IZ]; Sandflat [SF]; Muddy Sand/Sandy Mud [MS]; Ecological Islands/Microhabitats [EM]; and Sandy Beach [SB].

Splash Zone-Northern Jetty [SZ]: Three species of gastropods are residents of the splash zone, the highest habitable point upon the jetty. They include the limpets *Lotia digitalis* and *L. gigantea*, and the periwinkle *Littorina keenae*. The vertical zonation of these species is best seen on the north (Dockweiler State Beach) side of the jetty.

Intertidal Zone-Northern Jetty [IZ]: Three common

sessile pelecypods, the mussels *Mytilus californianus* and *M. ?gallioprovincialis*, and the oyster *Ostrea conchaphila*, are breakwater inhabitants, occurring from the base of the splash zone to the foot of the jetty. The two mussel species normally live in dense aggregates, whereas *Ostrea* often occurs individually, often growing on *Mytilus*. At the foot of the jetty, the sessile colonial gastropod *Serpulorbis squamigerus* sometimes replaces *Mytilus*.

Four true limpets are common residents of the jetty below the splash zone and are often found living in or near mussel beds. They are *Lottia conus*, *L. limatula*, *L. pelta*, and *L. scabra*. The periwinkle *Littorina scutulata* is also associated with the dense aggregates of mussels.

At the foot of the jetty, *Tegula funebris* and *T. gallina* inhabit rock crevices and are found at the base of rocks. Large specimens of both species are not uncommonly seen.

Four carnivorous gastropods also live at the foot of the jetty. A population of *Nucella emarginata* inhabits mussel beds on the north-facing side, as does *Acanthina spirata*. However, the two species are discretely segregated here, with *Acanthina* populating the westernmost portion of the breakwater and *Nucella* being found a bit farther eastward. *Acanthina* is also found on the south-facing side, and again populates the westernmost end of the jetty (Figure 3). There, it may coexist with *Pteropurpura festiva* and *Roperia poulsoni*, which live at the base of rocks and in rock crevices.

Several species of polyplacophorans are inhabitants of the basal portion of the breakwater. These include the ubiquitous chitons *Mopalia muscosa* and *Nuttalina californica*.

Sandflat [SF]: A number of common gastropod and pelecypod infauna inhabit the sandflat that lies at the foot of the south side of the jetty. Gastropods include *Bulla gouldiana*, two species of *Nassarius* (*N. fossatus* and *N. tegula*), two species of *Olivella* (*O. baetica* and *O. biplicata*), and two species of naticids (*Euspira lewisii* and *Neverita reclusianus*). The smaller of the two species of *Nassarius*, *N. tegula*, is found living "colonially" on the upper flat, where it is often seen trailing through wet sand. *Olivella baetica*, the smaller and less common species of *Olivella*, is encountered between the foot of the jetty and low water, and is commonly seen trailing in places where water shallowly pools. Low-water sandflat residents include *Bulla gouldiana*, *Olivella biplicata*, *Euspira lewisii*, and *Neverita reclusiana*, with *Euspira* being the less



Figure 3. Aggregation of *Acanthina* depositing egg capsules on the side and underside of a rock in the low intertidal zone at the southern foot of the jetty.

common of the two naticids. These gastropods are usually found shallowly buried beneath the sand, but are visible trailing along the sides of the dropoff into the entrance channel during extreme minus tides. *Nassarius fossatus* inhabits the flat from the foot of the jetty to low water. It is almost always discovered shallowly buried.

Several pelecypod species are common sandflat inhabitants. *Cooperella subdiaphana*, *Donax gouldii*, *Laevicardium substriatum*, *Leporimetis obesa*, *Macoma secta*, *Simomactra californica*, and two species of *Tagelus* (*T. subteres* and the larger *T. californianus*) are all found at or near low water. These animals are exposed when pooled water at the foot of the jetty cuts runoff channels into the flat when flowing downhill into the entrance channel. In addition, wave action created by passing boats erodes away the foot of the flat, uncovering shallowly buried bivalves (and univalves such as *Bulla*, *Euspira*, *Neverita*, and *Olivella* as well). *Tivela stultorum* inhabits a position higher on the flat.

Muddy Sand/Sandy Mud [MS]: Mud commingled with sand forms the substratum at the foot of the jetty in the vicinity of the Grand Canal/Ballona Lagoon outflow. *Chione undatella*, *Protothaca staminea*, and *Saxidomus nuttallii* commonly burrow into this mud/sand base, and the dead valves of these animals are abundant.

Ecological Islands/Microhabitats [EM]: Quarry rock resting in the substratum at the base of the jetty forms ecological islands or microhabitats (Figure 4). Characteristic species of these rock microhabitats

include *Conus californicus*, *Crepidula onyx*, *Mytilus ?gallioprovincialis*, *Pteropurpura festiva*, *Roperia poulsoni*, and *Serpulorbis squamigerus*. *Conus*, *Pteropurpura*, and *Roperia* are all found in the muddy sand at the base of the rocks or living within colonies of *Serpulorbis*. *Pteropurpura* and *Roperia* also inhabit rock crevices. Small specimens of *Crepidula onyx* are often found growing on *Conus californicus*.



Figure 4. *Mytilus* attached to rock microhabitats at the base of the south side of the jetty. Small runoff channels cut their way through the muddy-sand substratum.

Discarded human debris may also provide microhabitats upon or within which organisms may find a permanent home or temporary shelter. For example, the minute gastropod *Cerithiopsis carpenteri* was found living upon a sponge that had encrusted a segment of monofilament fishing line in the mudflat habitat immediately west of the Grand Canal/Ballona Lagoon outflow.

Sandy Beach [SB]: Immediately north of the jetty on the broad, exposed, sandy expanse of Dockweiler State Beach, the gastropod *Olivella biplicata* and the pelecypods *Donax gouldii* and *Tivela stultorum* are found shallowly buried at low water. The presence of *Donax* and *Tivela* is indicated by hillocks of sand that form above them as the surrounding substratum dries out following the ebbing of the tide. Similarly, protrusion of the hydroid *Clytia bakeri* Torrey above the substratum often discloses the existence of shallowly buried *Donax* and *Tivela*, as it is commonly found growing on the shells of these two species at Dockweiler State Beach.

Faunal List

The faunal list that follows represents the 75 taxa of shelled mollusks recorded along the northern jetty during the study period. Most identifications are from McLean (1978). Systematic classifications follow Vaught (1989) for the gastropods and chitons, and Coan and Scott (1997) for the bivalves. The habitat zone or zones in which each taxon was recorded is also included.

Class Gastropoda
Subclass Prosobranchia
Order Archaeogastropoda
Family Lottidae
Lottia Gray, 1833

Lottia pelta (Rathke, 1833) [IZ]
Lottia digitalis (Rathke, 1833) [SZ]
Lottia scabra (Gould, 1846) [IZ]
Lottia conus (Test, 1945) [IZ]
Lottia limatula (Carpenter, 1864) [IZ]
Lottia ochracea (Dall, 1871) [IZ]
Lottia strigatella (Carpenter, 1864) [IZ]
Lottia gigantea Sowerby, 1834 [SZ], [IZ]

Tectura Gray, 1847

Tectura fenestrata (Reeve, 1855) [IZ]

Family Fissurellidae

Megathura Pilsbry, 1890

Megathura crenulata (Sowerby, 1825) [EM]

Family Trochidae

Calliostoma Swainson, 1840

Calliostoma tricolor Gabb, 1865 [IZ]

Tegula Lesson, 1835

Tegula eiseni Jordan, 1936 [IZ], [EM]

Tegula funebris (A. Adams, 1855) [IZ], [EM]

Tegula gallina (Forbes, 1852) [IZ], [EM]

Order Mesogastropoda

Family Littorinidae

Littorina Ferussac, 1822

Littorina keenae Rosewater, 1978 [SZ]

Littorina scutulata Gould, 1849 [IZ]

Subfamily Lacuninae

Lacuna Turton, 1827

Lacuna unifasciata Carpenter, 1857 [IZ]

Family Vermetidae

Serpulorbis Sassi, 1827

Serpulorbis squamigerus (Carpenter, 1857) [IZ], [EM]

Family Cerithiopsidae

Cerithiopsis Forbes & Hanley, 1850

- Cerithiopsis carpenteri* Bartsch, 1911 [EM]
 Family Epitoniidae
 Epitonium Röding, 1798
Epitonium tinctum (Carpenter, 1864) [IZ]
 Opalia Adams & Adams, 1853
Opalia funiculata (Carpenter, 1857) [IZ]
 Family Calyptraeidae
 Crepidula Lamarck, 1799
Crepidula nummaria Gould, 1846 [EM]
Crepidula onyx Sowerby, 1824 [EM]
Crepidula naticarum Williamson, 1905 [EM]
 Crepidatella Lesson, 1830
Crepidatella dorsata (Broderip, 1838) [EM]
 Family Naticidae
 Euspira Agassiz in Sowerby, 1838
Euspira lewisii (Gould, 1847) [SF]
 Neverita Risso, 1826
Neverita reclusiana (Deshayes, 1839) [SF]
 Order Neogastropoda
 Family Muricidae
 Pteropurpura Jousseaume, 1880
Pteropurpura festiva (Hinds, 1844) [IZ], [EM]
 Roperia Dall, 1898
Roperia poulsoni (Carpenter, 1864) [IZ], [EM]
 Subfamily Thaidinae
 Acanthina Fischer de Waldheim, 1807
Acanthina spirata (Blainville, 1832) [IZ], [EM]
 Nucella Röding, 1798
Nucella emarginata (Deshayes, 1839) [IZ]
 Family Buccinidae
 Kelletia Fischer, 1884
Kelletia kelletii (Forbes, 1852) [IZ], [EM]
 Family Nassariidae
 Nassarius Duméril, 1806
Nassarius fossatus (Gould, 1849) [SF]
Nassarius mendicus (Gould, 1849) [EM]
Nassarius tegula (Reeve, 1853) [SF]
 Family Columbellidae
 Alia Adams & Adams, 1853
Alia carinata (Hinds, 1844) [SF]
 Family Olividae
 Olivella Swainson, 1831
Olivella baetica Carpenter, 1864 [SF]
Olivella biplicata (Sowerby, 1825) [SF]
 Family Conidae
 Conus Linnaeus, 1758
Conus californicus Reeve, 1844 [EM]
 Family Turridae
 Ophiidermella Bartsch, 1944
Ophiidermella inermis (Reeve, 1843) [SF]
- Kurtziella* Dall, 1918
Kurtziella plumbea (Hinds, 1843) [SF]
 Subclass Opisthobranchia
 Order Cephalaspidea
 Family Bullidae
 Bulla Linnaeus, 1758
Bulla gouldiana Pilsbry, 1893 [SF]
 Family Scaphandridae
 Acteocina Gray, 1847
Acteocina inculta (Gould, 1855) [SF]
 Order Basommatophora
 Family Trimusculidae
 Trimusculus Schmidt, 1818
Trimusculus reticulatus (Sowerby, 1835) [IZ]
 Class Polyplacophora
 Family Ischnochitonidae
 Lepidochitona Gray, 1821
Cyanoplax hartwegii (Carpenter, 1855) [IZ]
 Nuttallina Dall, 1871
Nuttallina californica (Reeve, 1847) [IZ]
 Stenoplax Dall, 1879
Stenoplax conspicua (Pilsbry, 1892) [IZ]
 Family Mopaliidae
 Mopalia Gray, 1847
Mopalia muscosa (Gould, 1846) [IZ]
 Class Bivalvia
 Order Mytiloidea
 Family Mytilidae
 Mytilus Linnaeus, 1758
Mytilus californianus Conrad, 1837 [IZ], [EM]
Mytilus?gallioprovincialis Lamarck, 1819 [IZ], [EM]
 Order Ostreoida
 Family Ostreidae
 Ostrea Linnaeus, 1758
Ostrea conchaphila Carpenter, 1857 [IZ], [EM]
 Order Veneroida
 Family Chamidae
 Chama Linnaeus, 1758
Chama arcana Bernard, 1976 [IZ], [EM]
 Family Cardiidae
 Laevicardium Swainson, 1840
Laevicardium substriatum (Conrad, 1837) [SF]
 Trachycardium Mörch, 1853
Trachycardium quadragenarium (Conrad, 1837) [SF]
 Family Veneridae
 Tivela Link, 1807
Tivela stultorum (Mawe, 1823) [SF], [SB]
 Amiantis Carpenter, 1864
Amiantis callosa (Conrad, 1837) [SF]
 Saxidomus Conrad, 1837

Saxidomus nuttallii Conrad, 1837 [MS]
Chione Megerle von Muhlfield, 1811
Chione undatella (Sowerby, 1835) [MS]
Protothaca Dall, 1902
Protothaca staminea (Conrad, 1837) [SF], [MS]
Protothaca laciniata (Carpenter, 1864) [SF], [MS]
 Family Petricolidae
Cooperella Carpenter, 1864
Cooperella subdiaphana (Carpenter, 1864) [SF]
 Family Mactridae
Simomactra Dall, 1894
Simomactra planulata (Conrad, 1837) [SF]
 Family Tellinidae
Tellina Linnaeus, 1758
Tellina modesta (Carpenter, 1864) [SF]
Macoma Leach, 1819
Macoma nasuta (Conrad, 1837) [SF], [MS]
Macoma indentata Carpenter, 1864 [SF], [MS]
Macoma secta (Conrad, 1837) [SF]
Macoma yoldiformis Carpenter, 1864 [SF]
Leporimetis Iredale, 1930
Leporimetis obesa (Deshayes, 1855) [SF]
 Family Donacidae
Donax Linnaeus, 1758
Donax gouldii Dall, 1921 [SF], [SB]
 Family Psammobiidae
Nuttallia Dall, 1898
Nuttallia nuttallii (Conrad, 1837) [SF]
 Family Solecurtidae
Tagelus Gray, 1847
Tagelus californianus (Conrad, 1837) [SF]
Tagelus subteres (Conrad, 1837) [SF]
 Family Solenidae
Solen Linnaeus, 1758
Solen rostriformis Dunker, 1862 [SF]
 Order Myoida
 Family Hiatellidae
Hiatella Bosc, 1801
Hiatella arctica (Linnaeus, 1767) [low tide to deep water]
 Order Pholadomyoida
 Family Thraciidae
Thracia Sowerby, 1823
Thracia curta Conrad, 1837 [IZ]

Conclusions

The large expanse of vertical area along the jetty and the ecological habitats exposed at its base during periods of low tides offer an opportunity to study the

distribution of species at what is, less than 40 years after its construction, a relatively young locality that is now home to a sizeable community of marine invertebrates. Over the seven-year period 1988 to 1994, 75 taxa of shelled marine mollusks were identified as inhabiting this community. Some of these species may be ephemeral, as the writer's observations show the existence of an established molluscan fauna possessing a definite vertical zonation. Certain species were found to be characteristic of a habitat and essentially served to define it.

The molluscan fauna at this locality proved to be dynamic. Changes in the relative abundance and population densities of species, the spatial relationships between species, and interspecific relationships were noted. In addition, loss of habitat attributable to disturbing agents was also observed.

The creation of a faunal list of the shelled marine mollusks inhabiting the jetty and their deposition into the LACMNH reference collection provides a resource that could potentially be used to determine the status of the molluscan community at this locality in the years to come. A future comparative species assessment might be a useful method of establishing the effectiveness of cleanup projects that impact contaminant levels in the entrance channel. It may also be a way of determining the effect of future dredging operations in the channel. At minimum, it provides an historical account of the species inhabiting this site during a fixed period of time.

Much work still remains to be done intertidally at the northern jetty. For example, because most research was conducted during wintertime low tides, there is little information concerning seasonal periodicity in species. Moreover, given the amount of vertical area to be covered, the density of *Mytilus* beds and *Serpulorbis* colonies, and the obvious ability of the substratum to obscure infauna, it seems logical to assume that some species were overlooked and still await discovery at this locality. In addition, the possibility exists that species new to the jetty may have established themselves since 1994. Additional ephemeral visitors may also be locatable.

Acknowledgments

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Dr. James A. Fawcett, Los Angeles County Beaches and Harbors Department, for his review of the original manuscript and for furnishing information concerning physical features of the marina and historical information regarding its construction.

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BOOK NEWS

Several announcements of new publications have come to our attention. They are listed below for your attention although they have not yet been seen for a critical review.

A revision of the Scaphopoda from Australian waters (Mollusca).

By: Kevin L. Lamprell & John M. Healy, 1998.
Published: Records of the Australian Museum, Supplement 24: 1-189.
Price: \$75 Australian.

The study reviews the entire scaphopod fauna of Australia, a total of 108 species in the orders Dentaliida and Gadiliniida. Each species is supported by line drawings and photographs and all taxa and illustrations are indexed.

The work is said to almost triple the previously known list of scaphopods from the region including forty-seven new species and one Tertiary fossil species. Some museum types are also figured for the first time.

For further information, contact Australian Museum Scientific Publications, 6 College St., Sydney NSW, Australia or FAX + 612-9320-6073 or email: www.austmus.gov.au

Karl Eduard von Martens (1831-1904): His Life and Works

By: Alan R. Kabat & Kenneth J. Boss, 1997.
Price: \$50 US plus US \$5 shipping and handling.
400 pages, hardbound, buckram, octavo size.

Delineates the life and scientific contributions of Karl Eduard von Martens, including a biogeographical sketch, information on his professional career, and a complete bibliography of his publications and a full catalogue with subsequent references of note.

To order, write to Dept. of Mollusks, Museum of Comparative Zoology, Harvard University, 26 Oxford St., Cambridge, MA 02138, USA.

Common and Scientific names of Aquatic Invertebrates from the United States and Canada: Mollusks. 2nd edition.

By: Turgeon, D. D. and 14 others. 1998.
Published: American Fisheries Society Special Publication 25 : i-x + 1-526.
Price: \$59 US (including CD ROM).

This is an update of the first edition covering terrestrial, freshwater, estuarine and marine mollusks down to a depth of 200 m on the continental shelf in North American waters, north of Mexico.

THE FIRST WORLD CONGRESS OF MALACOLOGY

GEORGE E. METZ

121 Wild Horse Valley Drive, Novato, California, USA

On the 25th of July, the Washington D.C. area, replete with buildings and monuments of great historical and cultural significance, was invaded by thousands and thousands of tourists, from all over the world. Among these vast throngs, a much smaller group of approximately five hundred attendees from some forty-nine countries, gathered for the first World Congress of Malacology, sponsored by the Smithsonian Institution and co-sponsored and organized by the American Malacological Union and Unitas Malacologia. Financial support was provided by several organizations including the Western Society of Malacologists. Registrants were housed in Thurston Hall at nearby George Washington University and local hotels were available for those who did not aspire to the Spartan life.

The program consisted of multiple symposia: "Refining Molluscan Characters," William F. Ponder, convener; "Refining Molluscan Characters/Phylogeny," Gerhard Haszprunar, convener; "Interactions Between Humans and Molluscs," George M. Davis, convener; and "Bridging the Temporal Scales in Malacology: Uniting the Living and Dead," Doug Erwin, convener. Add to these symposia many sections of contributed papers covering, biodiversity, genetics, systematics, biogeography, physiology, ecology, shell structure, conservation and many other topics, and the field of molluscan study was covered in its entirety. There was something for everyone.

Following registration on Saturday and Sunday morning, the Congress was opened that afternoon, with welcoming remarks by Robert Hershler, President of the AMU., Rüdiger Beiler, President of UNITAS and Robert Fri, director of the National Museum of Natural History. Keynote addresses were given by Geert Vermeij, Daniel Alkon and Gerhard Haszprunar.

The reception was held in the National Museum of Natural History's rotunda, around the enormous mounted African elephant with trunk up-raised and appearing as if it might charge at any moment, a spectacular centerpiece, not often seen at a reception.

There were several types of delicious food, accompanied by a nice bar. Everyone took the opportunity to renew friendships and establish new ones. All seemed to have had a wonderful evening.

The meeting proper, was divided into the symposia presented each morning until noon in the Baird Auditorium of the National Museum of Natural History and the afternoon session, held in the Ripley Center, along with a great exhibition of Lalique jewelry, should you be interested. The contributed papers were presented in eight different sections. The poster sessions ran concurrently with the afternoon meetings. There were almost as many posters as contributed papers, so that there were different posters at each afternoon session. One innovative factor at the poster presentation was the requirement that the author be in attendance during a certain portion of the display time which permitted discussion and questions.

I found several presentations of great interest. Among them were Carole Hickman's, "The gastropod larval shell as a model for integrative analysis of structure;" Daniel Geiger's, "DNA data as elementary hypotheses: how to avoid impossible character state reconstructions" and "Biogeography of the Halitidae (Gastropoda: Vetigastropoda);" and Olle Israelsson's "*Xenoturbella bocki*: the most primitive bilaterian animal or a protobranch bivalve? The killing of a phylum."

On Tuesday night, The AMU book auction took place in a George Washington University auditorium, again well attended (there was free food). Food and a non-hosted bar were provided. The auction contained many nice books and other donated items and was financially successful. A dinner cruise aboard the ship *Odyssey* sailing along the Potomac River was the big banquet evening. There were at least four hundred or more guests attending, but because it was a large boat, well designed, there was plenty of room for all. There were two dance floors, one at each end of the ship, with two musical groups playing simultaneously. The bars

and food serving lines were also duplicated providing prompt service for all. Another great evening. On Friday a fossil collecting field trip with transportation was provided for all those interested.

The WSM was well represented with sixteen members presenting either papers or posters, and in some cases, several members presented both! Everyone agreed that it was a very successful, productive meeting.

FAVARTIA (MUREXIELLA) PERITA (HINDS, 1844) AT ISLAS LAS TRES MARIETAS, NAYARIT, MÉXICO

CAROLE M. HERTZ

Associate, Santa Barbara Museum of Natural History,
2559 Puesta del Sol Road, Santa Barbara, CA 93105, USA

In January of last year, my husband Jules and I visited Kirstie Kaiser at her home in Puerto Vallarta, Jalisco, México. In accessioning some material from the Islas Las Tres Marietas in her collection, we found a beautiful, small (17.4 mm) muricid that had been dredged by Carol & Paul Skoglund and Kirstie in February 1995. I later identified the specimen, which had been dredged off Isla Grande in 27-40 meters in February 1995, as *Favartia (Murexiella) perita*.

Favartia (M.) perita was described from Bahía Magdalena, Baja California, México. Radwin & D'Attilio (1976) listed the distribution from Bahía Magdalena to the Golfo de Tehuantepec, México; D'Attilio (1987) illustrated specimens from Isla Cébaco, Montijo, Panamá, and Bahía San Carlos, Guaymas, Sonora, México. Finet (1985) noted the species from the Islas Galápagos. A specimen of this uncommon muricid from Islas Las Tres Marietas at the entrance to Bahía Banderas, is shown in Figure 1.

My thanks to Kirstie L. Kaiser for her hospitality and for making her collection available to me, to Barbara W. Myers for confirming the identification of the species and to David K. Mulliner for taking the photograph of this beautiful muricid.

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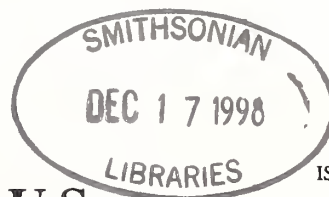
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Figure 1. *Favartia (Murexiella) perita* (Hinds, 1844), apertural view of a 17.4 mm specimen dredged from Islas Las Tres Marietas, Nayarit, México. K. L. Kaiser Collection. Photo: D. K. Mulliner.

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THE FESTIVUS

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Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

PROGRAM

The Diversity of World-Wide Abalone (Gastropoda: Haliotidae): Recent Clarifications and Lingering Problems

Daniel Geiger will give a slide program on world-wide abalone and discuss new findings in his studies of

this group of mollusks. Dan invites members to bring in their problem abalone for identification.

Meeting date: November 19, 1998
Shells of the month: world-wide abalone

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting - October 15, 1998

President Wes Farmer called the meeting to order with about 22 members in attendance. The minutes were approved as published in *The Festivus*. It was announced that the speaker for the November meeting is Dan Geiger from USC who will speak on worldwide abalone. There was no report from the treasurer. Books, reprints, tee shirts and mugs were all available for sale.

Linda Hutsell announced that John LaGrange was featured in the Union Tribune recently in an article highlighting the problems in the fishing industry. Wes encouraged everyone to use the resources in the Club's fine library.

The slate of officers for 1999, as nominated by the board (the nominating committee), was presented.

President: Terry Arnold

Vice President: Mike Mason

Corresponding Secretary: Kim Hutsell

Recording Secretary: Silvana Vollero

Treasurer: Linda Hutsell

Editor: Carole Hertz

The Club will accept nominations from the floor at the November meeting after which the election will take place. The installation of officers will be at the Club Christmas Party.

The Christmas Party will be on December 5th. [For further information, see column two].

The winner of the shell drawing was Emily Herrmann and the refreshments for the evening were provided by the Schneiders, the Hertzes and Wes Farmer.

The scheduled speaker, Hans Bertsch, was forced to cancel at the last minute due to illness. Fortunately Richard Herrmann and Wes Farmer stepped in to provide a very enjoyable slide program. Richard showed slides of a recent trip to the San Clemente Island area and reported that the kelp is coming back since the El Nino storms. He also spoke of the growing number of Panamic species being found in the area. Wes then followed with his slides and discussed how the cliffs at the Torrey Pines Reserve are constantly changing. He studies the rocks that fall from the cliffs

and has found some interesting fossils.

The meeting was adjourned at 8:30 p.m. to enjoy the refreshments and each other's company and browse and buy items on the sale table.

The Annual Club Christmas Dinner Party

The Club's annual Christmas Party will be held in the Montfield Room at the Four Points Hotel on Saturday evening December 5th beginning at 6 P.M. with no host cocktails and dinner served at 7 P.M.

The three entree choices for the dinner are: Chicken breast stuffed with spinach, mushrooms and sundried tomatoes with a garlic cream sauce, served with rice; Oven roast pork loin with bordelaise mint sauce served with potatoes; or a Vegetarian pasta dinner. All dinners include a mixed green salad with cherry tomatoes, hearts of palm and chives with choice of dressing; rolls and butter; a dessert of Chocolate Yule log with powdered sugar and cinnamon, garnished with berries; and choice of coffee, decaf, tea or iced tea. The Club will provide the table wine.

The total cost of the dinner including tax and gratuity is \$25. Reservations (with check and choice of entree listed) must be received by December first.

Bring a wrapped shell gift (only general locality on the outside, i.e. Indo-Pacific, Panamic) for the traditional gift exchange.

If you have any questions, contact Carole and Jules Hertz at 619-277-6259. Plan to attend; it's always a great party with fine food and good friends.

There is no regular meeting in December.

Dues are Due

This is the last issue of *The Festivus* for 1998. *The Festivus* publishes eleven issues annually, excluding December.

You will notice a green slip inserted in your issue announcing that dues for 1999 are payable to the Club. We have tried not to include slips in the issues going to members who have already paid for 1999. If you receive a green dues notice and have already paid, please disregard the notice.

NOTES ON THE COLUMBELLID GENUS *MAZATLANIA* DALL, 1900

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The columbellid genus *Mazatlanian* Dall, 1900 (which was proposed as replacement name for the preoccupied *Euryta* H. & A. Adams, 1853), was thought by Dall and earlier authors, including Carpenter (1857: 388), to be a subgroup of *Terebra* in the Terebridae. Many of the specific names were, in fact, first introduced as *Terebra*, so it is not surprising that yet another name – *Terebra moolenbeeki* Aubrey, 1995 – should also be an apparent member of *Mazatlanian*. Having been asked by *The Festivus* editor Carole Hertz to assess the status of *Terebra moolenbeeki*, I take this opportunity also to comment on other taxa of *Mazatlanian*. These notes are supplementary to the two most recent accounts treating *Mazatlanian*: Radwin (1978: 336) and Bouchet & Gofas (1983).

The holotype (Figure 1) of *Terebra moolenbeeki* Aubrey, 1995 (p. 30, unnumbered figures) from Playa Nancite, Santa Rosa, Guanacaste Province, Costa Rica (holotype, Zoologisch Museum, Amsterdam, cat. no. 3.95.011, examined on loan), has the apertural characters of *Mazatlanian*, but differs from *M. fulgurata* (Philippi, 1846) in its complete lack of the zigzag pattern of brown lines, instead having irregular tan markings on the central portion of the whorl, with a lighter colored band below the suture. Similarly colored shells of *M. fulgurata* are present in small numbers, some having only traces of the zigzag pattern and some lacking it altogether, mixed with more numerous specimens having the usual zigzag pattern, from Bahía Matanchén, San Blas, Nayarit, México (LACM 118268 and LACM 70-2). There is a single specimen from Punta Cameron, Mazatlán, Sinaloa, México (LACM 55353), lacking the zigzag pattern. These specimens are smaller (to 16 mm) than the relatively large holotype of *moolenbeeki* (23 mm length). However, there are other large specimens of *M. fulgurata* in the LACM collection having the typical coloration (Figure 2), so it is not unreasonable to conclude that the single specimen described as *moolenbeeki* is a synonym of *M. fulgurata*.



Figures 1-2 (l-r). *Mazatlanian fulgurata* (Philippi, 1846). (1) Holotype of *Terebra moolenbeeki* Aubrey, 1995, Zoological Museum, Amsterdam, cat. no. 3.95.011, Playa Nancite, Santa Rosa, Guanacaste Province, Costa Rica. Length 22.7 mm. (2) LACM 10512, Playa Miramar, Bahía Santiago, Colima, Mexico. Length 22.6 mm.

Radwin (1978: 336) detailed the generic characters of *Mazatlanian* and recognized two New World species: the strongly nodulous *M. aciculata* (Lamarck, 1822) and the more slender *M. fulgurata* (Philippi, 1846), both considered to be amphi-American, i.e., occurring in

both the Caribbean and Panamic provinces. Bouchet & Gofas (1983) showed that *M. cosentini* (Philippi, 1836) is the correct name for the western Atlantic species previously considered to be *M. aciculata* (Lamarck, 1822), the latter name rejected as a homonym because it is preoccupied by *Buccinum aciculatum* Gmelin, 1791.

Radwin placed the eastern Pacific *Mazatlanian hesperia* Pilsbry & Lowe, 1932, under *M. aciculata*, but I prefer to recognize *M. hesperia* as the more strongly ribbed species in the Panamic Province because no Panamic specimens examined by me are close to being as nodulous as figured by Radwin (1978, fig. 24) or Bouchet & Gofas (1983, fig. 2) for the Caribbean species now known as *cosentini*, which is well represented in the LACM collection from Venezuela. The only specimens identified as *M. hesperia* in the LACM collection are from Mazatlán and Cabo San Lucas.

Whether Caribbean specimens identified by Radwin under the Panamic name *fulgurata* should be so identified is not clear to me and merits further consideration. There are no slender taxa now in synonymy of *M. fulgurata* with a Caribbean type locality. Specimens are in the LACM collection from Venezuela.

Radwin designated Mazatlán, Sinaloa, México, as the type locality of *M. fulgurata*, which seems to have been unnecessary, given that Carpenter (1857: 388) quoted Mazatlán as the source of Philippi's species. Radwin (1978: 337) reported that type material of *fulgurata* is in the British Museum (Natural History), but Dr. David Reid has not been able to find it therein (Reid, pers. comm.). *Terebra arguta* Gould, 1853, from the "Gulf of California," [holotype MCZ 169044] is listed in both editions of Keen (1958, 1971) and by Radwin as an additional synonym of *M. fulgurata*. Here I note that the Pleistocene *Terebra magdalensis* E. K. Jordan, 1936 (p. 52, pl. 19, figs. 1-3), which was missed by these authors and by Keen (1971: 588), is a *Mazatlanian* and probably another synonym of *M. fulgurata*.

Whether Radwin (1978: 337) was correct in placing the yet unrecognized *Aesopus goforthi* Dall, 1912 (p. 127) in synonymy of *M. fulgurata*, is contentious, considering that the single original specimen of *goforthi* (later figured by Dall 1921, pl. 9, fig. 4) has no axial sculpture whatever and lacks the raised cord on the fasciole that is a hallmark of *Mazatlanian*. Radwin did not comment on this in his text. The true identity of

goforthi (holotype, USNM 249624), said to be from Monterey, California) remains a mystery. I think it more likely that *Aesopus goforthi* is based on a yet undetermined, mislocalized specimen from an unknown faunal province.

The high variability of species of the genus *Mazatlanian* warrants more detailed attention, as does the question as to whether there are true amphi-American distributions in this genus, but other commitments do not permit me to pursue the matter. My hope is that this note will call attention to an interesting and important problem.

ACKNOWLEDGMENTS

I thank Robert Moolenbeek of the Zoological Museum, Amsterdam, for bringing the question of the identity of the taxon *moolenbeeki* to my attention and for arranging the loan of the type specimen. I thank David Reid (British Museum) for searching for type material of *Mazatlanian fulgurata* and David Mulliner, who prepared the figures from my negatives. Carole Hertz and Carol Skoglund encouraged me to prepare this note.

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THE TEREBRIDAE FROM THE NORTHERN GOLFO DE CALIFORNIA, MÉXICO, FROM THE GEMMELL COLLECTION (1965-1976)

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Abstract: Eleven species of *Terebra* are recorded here from the the San Felipe area, Baja California, México. Six of the species are new distributional records, 3 of which are also intertidal records.

Introduction: As part of our continuing study of the mollusks from the Gemmell Collection, we here report on eleven species of *Terebra* from the San Felipe area, Baja California (31°03'N, 114°50'W), six of which comprise new distributional records and three of those are reported from the intertidal for the first time. The eleven species are arranged alphabetically, an asterisk next to a species name indicating an extension of the known distribution since Bratcher & Cernohorsky (1987) published their comprehensive monograph on the worldwide Terebridae. Species newly recorded from the San Felipe area are figured herein. All the species were compared with material in the Carol Skoglund Collection and their identifications confirmed by her. All specimens in the Gemmell Collection are currently housed in the San Diego Natural History Museum.

Family Terebridae
Genus *Terebra* Bruguière, 1789

**Terebra argosyia* Olsson, 1971
(Figure 1)

Bulletin of Marine Science 21(1):41, figs. 28-30, 1971.

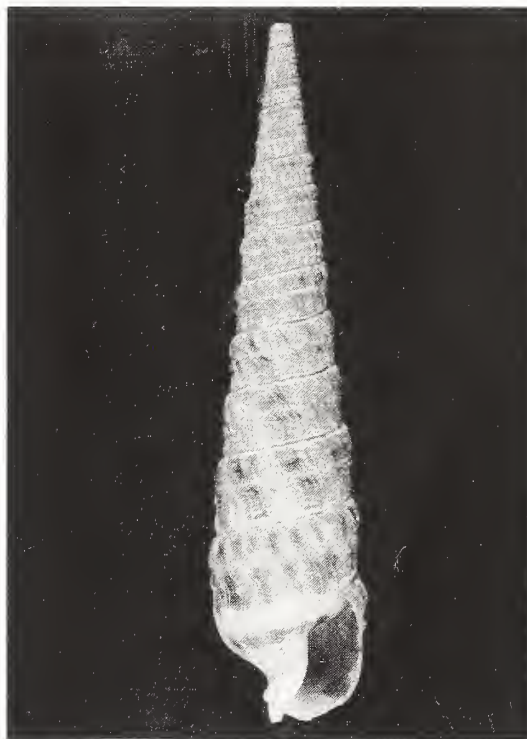


Figure 1. *Terebra argosyia* Olsson, 1971, apertural view of 32.4 mm specimen from Ensenada Blanca, San Felipe. Photo: D. K. Mulliner.

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Specimens collected: 2 specimens, 32.4-34.0 mm L, Ensenada Blanca, San Felipe, intertidal, one specimen live, March 1967.

Remarks: This is the first record of the species at San Felipe and the first record of the species in the intertidal zone.

Distribution: Described from Isla La Plata, Ecuador, by Olsson, Bratcher (1991) noted the species from Islas Cébaco and Gubernadora, Panamá; Koch (1992) listed the species from Guaymas, Sonora, México, and Mulliner (1996) noted the species at Isla Danzante on the Baja side of the Golfo de California.

Terebra armillata Hinds, 1844

Proceedings of the Zoological Society of London, Pt.11:154. Figured: Hinds in Sowerby, 1844, Thesaurus Conchyliorum 1:173, pl. 43, fig. 49.

Specimens collected: 1 specimen, 4.7 mm L, dredged by fishing boat *Chamizal I* off Consag Rock, San Felipe [31°06'N, 114°30'30"W], in 22 m in sand, mud and clay bottom and in sea star stomachs, 28 June 1969.

56 specimens, 6.5-51.0 mm L, Bahía San Felipe, intertidal, on sand bars, live collected.

1 specimen, 22.9 mm L, dredged by fishing boat, *Chamizal II* at station 7 [30°04'54"N, 114°34'W], W of S end of Isla El Muerto in sand in 15 m, 9 July 1969.

Remarks: Gemmell's notes state, "also found at Playa Laguna, Playa Alicia and Ensenada Blanca" in San Felipe.

Distribution: This species had not been reported from the Golfo de California by Bratcher & Burch in Keen (1971) although it was listed by DuShane (1962) from Puertecitos, DuShane & Brennan (1969) from Consag Rock, San Felipe, and by DuShane & Sphon (1968) from Bahía San Luis Gonzaga. Bratcher & Burch in Keen reported the species from Bahía Santa María, outer coast of Baja California, México, to Perú. Bratcher & Cernohorsky (1987) included the Islas Galápagos in the range. Montoya & Kaiser (1988) listed the species from Isla del Coco, Costa Rica.

**Terebra berryi* Campbell, 1961
(Figure 2)

The Veliger 4(1):26, pl. 5, figs. 5, 6, 1961.

Specimens collected: 1 specimen, 26.6 mm, Ensenada Blanca, San Felipe, collected live, March 1967.

22 specimens, 7.4 - 29.9 mm L, Playa Alicia, San Felipe, live and dead collected, May 1967.

Remarks: Gemmell's notes state, "seasonal Nov. to Apr. or May 1965-68." This is the first report of the species in San Felipe.

Distribution: Reported from Puertecitos, (DuShane, 1962) and San Luis Gonzaga, both Baja California, México (DuShane & Sphon, 1968); Puertecitos to Costa Rica (Bratcher & Burch in Keen, 1971); Manabí Province, Ecuador (Shasky, 1984); Puertecitos to Isla del Coco, Costa Rica (Bratcher & Cernohorsky, 1987).

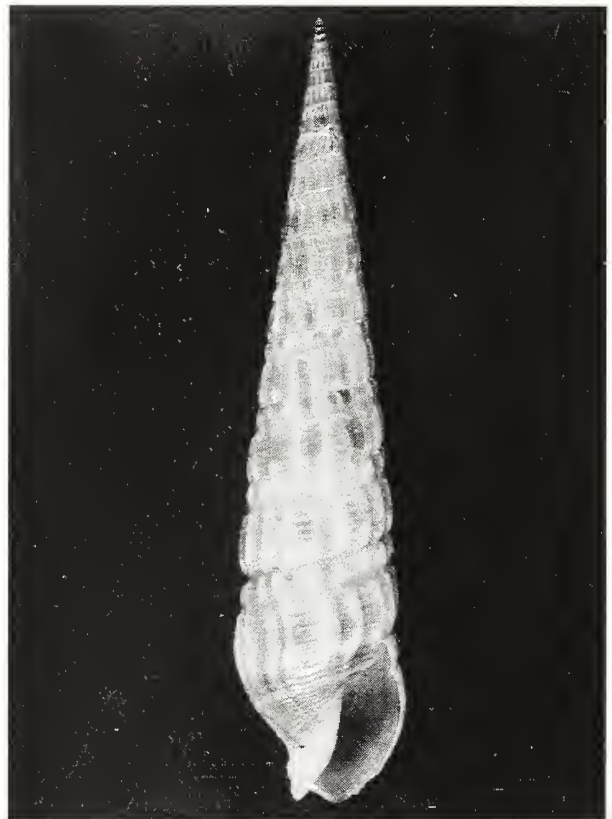


Figure 2. *Terebra berryi* Campbell, 1961, apertural view of 32.6 mm specimen from Playa Alicia, San Felipe. Photo: D. K. Mulliner.

Terebra bridgesi Dall, 1908

Bulletin of the Museum of Comparative Zoology, Harvard 43(6):490 1908. Figured: Keen (1958, fig. 958, syntype).

Synonym: *Terebra dushanae* Campbell, 1964.

Specimens collected: 1 specimen, 4.9 mm L, dredged by fishing boat *Chamizal I*, off Consag Rock, San Felipe, in 11-25 m, from sea star stomachs, 28 June 1968.

87 specimens, 5.2-9.0 mm L, Ensenada Blanca and Playa Alicia, San Felipe, on minus 5 ft low tide, in fine clean sand, collected live.

2 specimens, 7.7 and 8.5 mm L, Puertecitos.

Remarks: Joyce's notes state "never common....5/75 found still at Alicia."

Distribution: Consag Rock, San Felipe [as *T. dushanae*] (DuShane, 1969); Golfo de California to Panamá (Bratcher & Burch *in* Keen, 1971); Golfo de California to Ecuador (Bratcher & Cernohorsky, 1987).

**Terebra corintoensis* Pilsbry & Lowe, 1932
(Figure 3)

Proceedings of the Academy of Natural Sciences of Philadelphia 84:42, pl. 1, fig. 5, 1932.

Specimens collected: 1 specimen, 14.5 mm L, Playa Alicia, San Felipe, on minus tide, on sand, 28 April 1975.

Remarks: This is the first record of the species in the Golfo de California at San Felipe and the first report of the species in the intertidal zone.

Distribution: Baja California, México, to Ecuador (Bratcher & Burch *in* Keen, 1971; Bratcher & Cernohorsky, 1987); Isla del Coco, Costa Rica (Bratcher, 1986); Bahía San Carlos, Sonora, México (Poorman & Poorman, 1988).

**Terebra crenifera* Deshayes, 1859
(Figure 4)

Proceedings of the Zoological Society of London (Pt. 27):298, 1859. Figured: Bratcher & Burch *in* Keen, 1971, fig. 1531 [as *T. ligyrus*, Pilsbry & Lowe, 1932] and Bratcher & Cernohorsky, 1987, pl. 40, figs. 155a-c [holotype of *T. crenifera*].

Synonym: *T. ligyrus* Pilsbry & Lowe, 1932.

Specimens collected: 16 specimens, 14.8-32.0 mm L, Playa Alicia, San Felipe, on minus tide on sand, 27 April 1975.

Remarks: This is the first record of this species at San Felipe. DuShane (1962) reported *T. ligyrus* at Puertecitos.

Distribution: Southern California to Ecuador (Bratcher



Figure 3. *Terebra corintoensis* Pilsbry & Lowe, 1932, apertural view of 14.5 mm specimen from Playa Alicia, San Felipe. Photo: D. K. Mulliner.

& Burch *in* Keen, 1971; Bratcher & Cernohorsky, 1987).

Terebra petiveriana Deshayes, 1857

Journal de Conchyliologie 6:85, pl. 5, fig. 10, 1857.

Synonyms: *Terebra aspera* Hinds, 1844; *T. glauca* Hinds, [M. Smith, 1944, p. 35, fig. 466, not Hinds, 1844]; *T. glauca* Hinds, [Bratcher & Burch *in* Keen, 1971, p. 676, fig. 1538, not Hinds, 1844]; *Strioterebrum gatunensis kugleri* Rutsch [Petuch, 1981, not Rutsch, 1934].

Specimens collected: 80 specimens 9.1-48.6 mm L, San Felipe, collected prior to 1967, "common seasonally."

91 specimens, 5.2-39.6 mm L, N of Ensenada Blanca, San Felipe on minus tides, Sept.-Jan. 1966, Mar. - May 1967.

4 specimens, 5.0-9.5 mm L, off Punta Estrella, San



Figure 4. *Terebra crenifera* Deshayes, 1859, apertural view of 23.1 mm specimen from Playa Alicia, San Felipe. Photo: D. K. Mulliner.

Felipe, from sea star stomachs.

33 specimens, 4.2-12.8 mm, dredged by fishing boat *Chamizal I*, off Consag Rock, San Felipe [31°02'N to 31°20'N and 114°17' to 114°48'W] in sand, clay and mud at 11-28 m, in sea star stomachs, 28-29 June 1968.

Remarks: Prior to Bratcher (1979), this species had been collected in San Felipe as *T. glauca*.

Distribution: San Felipe, Baja California, México (Gemmell, Hertz & Myers, 1980); Golfo de California to Ecuador; Cartagena, Colombia; and Santa Marta, West Indies (Bratcher & Cernohorsky, 1987).

**Terebra puncturosa* Berry, 1959
(Figure 5)

Leaflets in *Malacology* 1(18):112-113. Figured: Hertz (1984:21, fig. 42, 1959).

Specimens collected: 7 specimens, 10.5-38.2 mm L,

Playa Alicia, San Felipe to Puertecitos, intertidally, 1969.

Remarks: This is the first report of the species at San Felipe and the first record of the species in the intertidal zone.

Distribution: Bahía Santa María, Baja California, México, to Perú (Bratcher & Burch in Keen, 1971; Bratcher & Cernohorsky, 1987); Cabo Tepoca, Sonora, México (Skoglund, 1974).



Figure 5. *Terebra puncturosa* Berry, 1959, apertural view of 39.5 mm specimen from Puertecitos. Photo: D. K. Mulliner.

Terebra robusta Hinds, 1844

Proceedings of the Zoological Society of London 11:149. Figured: Hinds in Sowerby, *Thesaurus Conchyliorum* 1:152, pl. 42, fig. 35, 1844.

Synonyms: *T. lingualis* Hinds, 1844; *T. loiroidi* Guérin-Ménéville, 1854; *T. insignis* Deshayes, 1857; *T. dumbauldi* Hanna & Hertlein, 1961.

Specimens collected: 1 specimen, 95.4 mm L, Bahía Willard, San Luis Gonzaga, dead collected, April

1966.

Distribution: Puertecitos (DuShane, 1962); Bahía Santa María, Baja California to Islas Galápagos (Bratcher & Burch *in* Keen, 1971; Bratcher & Cernohorsky, 1987); Esmeraldas, Ecuador (Baldazzi, DiCecco & Tiberi, 1986); Bahía San Carlos, Golfo de California (Poorman & Poorman, 1988).

**Terebra tuberculosa* Hinds, 1844
(Figure 6)

Proceedings of the Zoological Society of London for 1843:154-155, 1844. Figured: Hinds *in* Sowerby, 1844, Thesaurus Conchyliorum 1:175, pl. 43, fig. 48.

Synonyms: *T. cracilenta* Li, 1930; *T. tenuis* Li, 1930.

Specimens collected: 2 specimens, 47.2 & 53.5 mm L, Agua Chale [between Playa Alicia and Radar Beach], San Felipe, on sand bar, February 1968.

Remarks: This is the first report of the species from San Felipe.

Distribution: Bahía Santa María, Baja California, México, to Guatemala (Bratcher & Burch *in* Keen, 1971); include Ecuador in distribution (Bratcher & Cernohorsky, 1987).

Terebra variegata Gray, 1834

Proceedings of the Zoological Society of London, pt. 2:61, 1834. Figured: Reeve, 1860, Conchologia Iconica 12, pl. 16, sp. 12.

Figure reference: Bratcher & Burch *in* Keen (1971, no. 1571 [left, type]; Bratcher & Cernohorsky (1987, pl. 39, fig. 152a [holotype]).

Synonyms: *T. africana* Gray *in* Griffith & Pidgeon, 1833 [*nomen oblitum*]; *T. hupei* Lorois, 1857; *T. melia* Pilsbry, 1931.

Specimens collected: 25 specimens, 15.3-71.7 mm L, Puertecitos, live, March 1954.

3 specimens, 65.8-69.6 mm L, S side of Isla Willard, San Luis Gonzaga, live on sand bar, April 1969.

Remarks: Type locality not given by Gray; designated as San Felipe by Bratcher & Cernohorsky, 1987, without reference to a specific lot of specimens from that locality.

Distribution: Puertecitos, Baja California (DuShane, 1962); Guaymas, Sonora (DuShane & Poorman, 1967); Bahía Santa María, Baja California to Ecuador (Bratcher

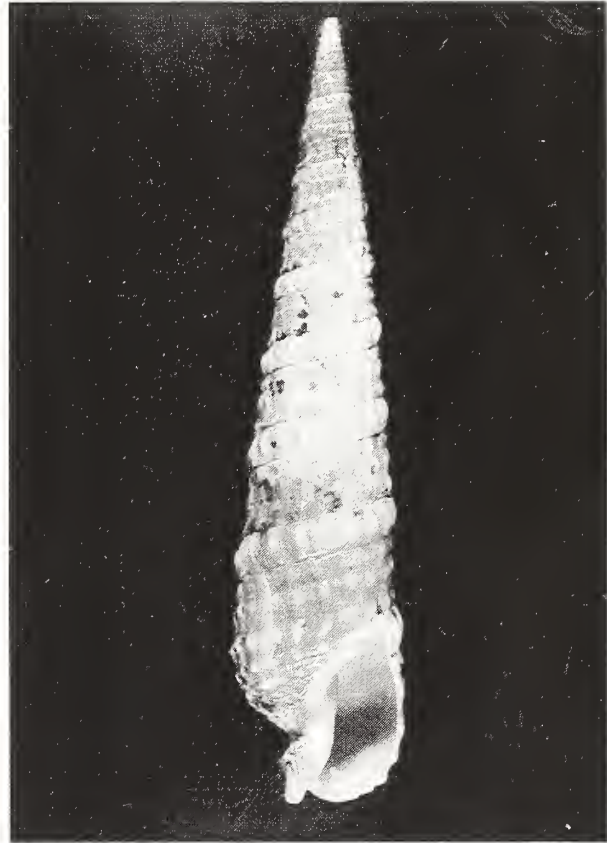


Figure 6. *Terebra tuberculosa* Hinds, 1844, 47.2 mm, apertural view of smaller of two specimens from Agua Chale, San Felipe. Photo: D. K. Mulliner.

& Burch *in* Keen, 1971); S to Máncora, Perú (Peña, G, 1970); Cabo Tepoca, Sonora (Skoglund, 1974); Islas Galápagos (Bratcher & Cernohorsky, 1987); Isla del Coco, Costa Rica (Montoya & Kaiser, 1988).

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Third Annual SCUM Meeting

The third annual gathering of the Southern California Unified Malacologists (SCUM) will take place on Saturday, 16 January 1999 at the Torrey Pines Campus of National University, 11255 North Torrey Pines Rd., La Jolla, CA 92037 and will be hosted by Hans Bertsch.

SCUM is an informal association of professional, amateur and student malacologists and paleontologists in southern California who are active or interested in research on mollusks. The purpose of the annual gatherings is to facilitate contact and keep informed of research activities and opportunities. There are no dues, officers, or publications. SCUM I was hosted by George Kennedy at San Diego State University in January 1997 and SCUM II was hosted by James McLean and Lindsey Groves at the Natural History Museum of Los Angeles County in January 1998.

All persons interested in Recent and/or fossil mollusks are invited to attend. Presentations and discussions should be informal and briefly cover research interests. A slide projector, overhead projector and internet capabilities will be available for those wishing to treat their work in more detail.

Coffee and doughnuts will be provided. A catered lunch by a local deli will be available for between \$5-7 to those who prefer not to leave the NU campus. Parking is free and maps of the area will be provided to those who wish to attend.

For further information on SCUM III, contact host Hans Bertsch. Phone: 619-642-8251; Fax: 619-423-9118 or E-mail: hbertschsch@nunic.nu.edu or write to Hans Bertsch, Professor of Biology, at the address above.

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